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THE PHRUDINAE OF TAIWAN (HYMENOPTERA: ICHNEUMONIDAE)[1]

by

Shui-chen Chiu and Chen-yu Wong[2]

Abstract: The subfamily Phrudinae of Ichneumonidae has not been recorded from Taiwan. This paper presents 5 genera and 11 species from this island. Two known species, *Phrudus monilicornis* Bridgman and *Earobia paradoxus* Perkins are new to Taiwan, and 9 species namely *Brachyscleroma townesi* Chiu, *B. umbilici* Chiu, *Lygurus marjoriae* Chiu, *Phrudus longius* Chiu, *P. montanus* Chiu, *P. angustus* Chiu, *P. linorum* Chiu, *Astrenis granum* Chiu, and *A. densa* Chiu are new to science.

INTRODUCTION

The Phrudinae is one of the small subfamilies of Ichneumonidae (Hymenoptera). It is widely scattered in the Palearctic, Nearctic, Ethiopian and Oriental Regions. Ten genera are known in the world and 5 genera are present in Taiwan. As far as known, the species are internal parasitoids of beetle larvae e.g. *Apoderus* and *Laricobius*. Specimens are usually collected by sweeping in forests.

This paper presents 5 genera and 11 species of the Taiwanese Phrudinae. They are all new records in Taiwan. Among which, 9 species are new to science. All specimens including the types of new species treated in this paper are deposited in the collection of the Taiwan Agricultural Research Institute except for the specimens of *Lygurus marjoriae* Chiu and *Earobia paradoxus* Perkins are borrowed from the American Entomological Institute.

Subfamily **PHRUDINAE**

Fore wing 1.3–4.9 mm. long (Taiwanese species). Body small, slender to stout. Head transverse or erect-rectangular. Clypeus large to rather large, usually weakly convex, its apical margin thick, subtruncate or slightly arched, usually with an apical fringe of parallel hairs, the clypeus separated from face by a groove. Labrum concealed. Mandible with 2 teeth. Malar space with or without a vertical groove between eye and mandible. Antenna with pedicel rather large. Flagellum 12 to 29-segmented. Flagellar segment moniliform or cylindrical, without tyloids. Epomia usually present. Notaulus short or absent. Sternaulus shallow or absent. Propodeum areolated. Areolet present or absent, when present, triangular or subquadrate in shape, second recurrent vein with one bulla, nervulus nearly opposite or distad to basal vein, nervellus not broken or broken below middle. Apex of front tibia without a tooth on outer side. Hind tarsal claws simple or pectinate, at least at base. Tergite 1 slender, with spiracle at, before or behind the middle, glymma usually present. Epi-

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pleura wide and haired. Ovipositor short to long, its tip without a subapical dorsal notch, the tip of lower valve with or without teeth.

Key to the genera of Taiwanese Phrudinae

1. Second discoidal cell broad and short, basal abscissa of subdiscoideus less than 2.0x as long as second recurrent vein. Ovipositor sheath 2.1x to 4.2x as long as the depth of abdomen. 2
   Second discoidal cell narrow and long, basal abscissa of subdiscoideus more than 2.5x as long as second recurrent vein. Ovipositor sheath in length subequal to or less than the depth of abdomen. 3
2. Malar space with a distinct vertical groove between eye and mandible. Clypeus without a distinct transverse groove on midheight, its apex a little prolonged, somewhat pointed. Areolet stalked above. . . . . 1. ***Brachyscleroma***
   Malar space without a vertical groove between eye and mandible. Clypeus with a distinct transverse groove on midheight, its apex slightly roundly curved, somewhat transverse. Areolet lacking. . . . . 2. ***Lygurus***
3. Head and mesoscutum distinctly mat. Tergite 1 comparatively broad about 1.5x as long as apical width. Costula absent. . . . . 3. ***Earobia***
   Head and mesoscutum punctate or partly striate, never mat. Tergite 1 long and slender, 2.0–4.0x as long as apical width. Costula present or absent. 4
4. Areolet present. Hind coxa punctate never granulate. Tergite 1 more or less paralleled on both sides except apical part usually expanded, spiracular area somewhat broader, with or without very few indistinct longitudinal striae. . . . . 4. ***Phrudus***
   Areolet absent. Hind coxa with granulate surface. Tergite 1 broader at or near middle, usually with numerous distinct longitudinal striae. . . . . 5. ***Astrenis***

Genus **BRACHYSCLEROMA** Cushman

Brachyscleroma Cushman, 1940. Proc. U. S. Nat. Mus. 88:369.

Type species: *Brachyscleroma apoderi* Cushman. Original designation.

Fore wing 2.6–4.9 mm. long. Head in frontal view wider than long. Clypeus convexed with apical margin prolonged and somewhat pointed at middle. Malar space with a distinct vertical groove between eye and mandible. Face with coarse, dense and umbilicate punctures, or with moderate-sized and variously distributed punctures. Frons with sparse to moderately dense punctures. Temple sharply slopping backward to occipital carina, with sparse punctures. Flagellum 27 to 29-segmented, the segments cylindrical. Epomia strong on upper part. Mesoscutum densely, coarsely punctate, its margin reflexed and crenulated, notaulus present. Mesopleurum polished with very fine, sparse punctures and impression, sternaulus deep. Areolet stalked above. Second discoidal cell broad, discocubitus strongly arched before its middle, second recurrent vein and basal abscissa of subdiscoideus forming an obtuse angle, the latter about 1.0–1.2x as long as the former. Propodeum well-areolated. Basal half of hind coxa punctate, not mat. Abdominal segments beyond tergite 1 sparsely finely punctate, their terga as well as epipleura with dense hairs. Tergite 1 slender, gradually widened at apical 0.6 part, glymma deep, spiracle behind the middle. Epipleurum of tergite 2 separated from the tergite by a crease. Ovipositor sheath much longer than the depth of abdomen.

Key to the Taiwanese species of *Brachyscleroma*

Face normally punctate. Malar space about 1.8x as long as basal width of mandible. Ovipositor sheath about 2.1x longer than the abdominal depth. . . . . ***townesi*** Chiu, sp. nov.

Face distinctly coarsely densely and umbilicately punctate. Malar space about 1.0x as long as basal width of mandible. Ovipositor sheath about 4.2x longer than the abdominal depth. . . . . ***umbilici*** Chiu, sp. nov.

Brachyscleroma townesi Chiu, sp. nov.

♀: Fore wing (fig. 1a) 3.2–3.8 mm. long. Head (fig. 2a) in frontal view about 0.4x as long as wide. Clypeus with fine and sparse punctures. Malar space about 1.8x as long as basal width of mandible. Face with sparse and variously distributed punctures. Frons moderately densely punctate. Temple finely, sparsely punctate. Flagellum 28-segmented. Notaulus deep. Mesopleurum with a transversely diverging impression, one branch across at its mid-height and another one oblique on it lower posteriorly, somewhat parallel with the sternaulus which is about 0.5x the width of mesopleurum. Propodeum (fig. 3a) sparsely, weakly punctate, petiolar area polished, medially not concaved. Tergite 1 (fig. 4a) 2.4–2.9x as long as apical width (the holotype about 2.8x in ratio), with distinct, numerous, longitudinal striae except basal 0.4 and apex smooth, tergite 2 and its following tergites very finely and sparsely punctate. Ovipositor sheath about 2.1x as long as the abdominal depth.

Black. Mouthparts (except mandibular teeth brown), clypeus (except basal 0.3), scape, pedicel, tegula, front and middle legs and tarsal claws, fulvous. Flagellum with basal 4 to 6 segments fulvous, gradually become darker toward its apex. Epipleura 3 (basal 0.5) and hind leg, light brown. Wings hyaline, pterostigma and venation fuscous.

♂: Very similar to female in structure and color pattern, but differs in fore wing 2.6–3.2 mm. long. Tergite 1 1.7–3.3x as long as apical width.

Holotype ♀. Tayuling (Hualien), 2,560 m, 9–16. VI. 1980, K. S. Lin & B. H. Chen.

Paratypes 21♀, 7♂. Anmashan (Taichung): 2,275 m, 1♀, 6–9. VII. 1979, L. Y. Chou. Meifeng (Nantou): 2,130 m, 1♀, 15–22. V. 1979, Malaise trap; 1♀, 8. VI. 1980, K. S. Lin & B. H. Chen; 2,150 m, 1♂, 26. VIII. 1980, K. S. Lin & C. H. Wang; 2♂, 5–9. X. 1980, C. C. Chen & C. C. Chien; 5♀, 24–26. VI. 1981, K. S. Lin & W. S. Tang; 1♀, 28–29. VIII. 1981, L. Y. Chou & S. C. Lin; 1♀, 15. VII. 1982, S. C. Lin & C. N. Lin. Tayuling (Hualien): 2,560 m, 2♀, 9–16. VI. 1980, K. S. Lin & B. H. Chen; 1♀, 12–15. IX. 1980, K. S. Lin & C. H. Wang. Tsuifeng(Nantou): 2,300 m, 1♀, 16. VII. 1982, S. C. Lin & C. N. Lin. Tungpu (Nantou): 1,200 m, 1♀, 25–29. IX. 1980, L. Y. Chou & T. Lin; 1♀, 28. IV-2. V. 1981, T. Lin & C. J. Lee; 1♀, 18–23. XI. 1981, T. Lin & W. S. Tang; 1♀, 19–23. VII. 1982, L. Y. Chou & T. Lin; 1♀, 18–21. X. 1982, K. C. Chou & S. C. Lin; 1♀, 10–14. I. 1983, K. C. Chou & S. P. Huang. Wuling (Taichung): 1,900 m, 1♀, 27–29. VI. 1979, K. S. Lin & L. Y. Chou. Wushe (Nantou): 1,150 m, 1♂, 26–28. VIII. 1981, L. Y. Chou & S. C. Lin; 1♂, 30. VII-2. IX. 1982, L. Y. Chou & K. C. Chou; 1♂, 7–8. X. 1982, K. C. Chou. Yushih (Nantou): 1,750 m, 1♂, 4. VIII. 1981, T. Lin & W. S. Tang.

The name "*townesi*" is in honor of Dr. Henry K. Townes.

This species has the tergite 1 entirely black. Face with fine sparse punctures. Malar space about 1.8x as long as basal width of mandible. Ovipositor sheath about twice as long as abdominal depth.

Brachyscleroma umbilici Chiu, sp. nov.

♀: Fore wing (fig. 1b) 4.1–4.9 mm. long. Head (fig. 2b) in frontal view about 0.5x as long as wide. Clypeus partly with coarse and dense punctures. Malar space in length subequal to basal width

of mandible. Face with dense, coarse, umbilicate punctures. Frons coarsely densely punctate. Temple finely, sparsely punctate. Flagellum 28-segmented. Notaulus distinct, somewhat shallow. Mesopleurum with a transversely diverging impression, its upper branch crenulate, across about at midheight of the mesopleurum, and another branch smooth, more or less parallel to sternaulus which is about 0.5x the width of mesopleurum. Propodeum (fig. 3b) finely punctate, petiolar area medially somewhat concaved. Tergite 1 (fig. 4b) 2.8–3.2x as long as apical width (the holotype about 2.8x in ratio), with numerous longitudinal striae except basal 0.5 and the apex smooth. Tergite 2 and its following tergites with very fine and weak punctures. Ovipositor sheath about 4.2x as long as the abdominal depth.

Black. Mouthparts (except mandibular teeth brown), clypeus, face, frontal orbit (sometimes), scape, pedicel, mesoscutum (sometimes partly), scutellum (or apex only) and troughs of mesonotum and metanotum, postscutellum, propodeum (sometimes with basal 0.2–0.4 and apical margin black, tergite 1 (apical 0.5 black), tergite 4 (apically) and following tergites, or tergite 2 and its following tergites and epipleura of tergites 2, yellow to yellowish brown. Flagellum with basal 4 segments fulvous and gradually become darker toward its apex. Legs fulvous, hind coxa (except dorsally black), hind femur and hind tibia, light brown. Wings hyaline, pterostigma and venation fuscous.

♂: Very similar to female, but differs in having fore wing 3.6–4.2 mm. long. Tergite 1 3.1–3.4x as long as apical width, medially of petiolar area slightly concaved. Head entirely black. Hind coxa (ventrad lighter) black. Body more black colored.

Holotype ♀. Kenting (Pingtung), 18–23. III. 1981, K. S. Lin & T. Lin.

Paratypes 2♀, 6♂. Chiapaotai (Taichung): 750 m, 3♂, 14–18. X. 1980, K. S. Lin & C. H. Wang. Lienhuachih (Nantou): 650 m, 1♂, VII. 1984, Malaise trap. Meifeng (Nantou): 2,150 m, 1♀, 24–26. VI. 1981, K. S. Lin & W. S. Tang. Nantuan = Nansyo (Miaoli): 1♀, 16. V. 1937, J. Sonan. Taipinshan (Ilan) = Sankan, Taiheizan: 1♂, 16–18. VII. 1938, J. Sonan. Tungpu (Nantou): 1,200 m, 1♂, 19–23. VII. 1982, L. Y. Chou & T. Lin.

The name "*umbilici*" means navel, referring to the umbilicate punctures on the face.

This species can be recognized by its face with coarse, dense and umbilicate punctures. Malar space subequal in length of basal width of mandible. Ovipositor sheath rather long, about 4.0x as long as abdominal depth.

Genus **LYGURUS** Kasparyan

Lygurus Kasparyan, 1983. Contrib. Amer. Ent. Inst. 20:116–118.

Type species: *Lygurus townesi* Kasparayan. Original designation.

Fore wing 3.3–4.3 mm. long. Head in frontal view wider than long. Clypeus transverse, with a distinct, transverse groove at midheight, apical margin slightly rounded, not distinctly produced. Lower mandibular tooth slightly shorter than the upper tooth. Malar space without a vertical groove. Face, frons, vertex and temple, sparsely to densely punctate. Occipital carina transverse. Flagellum 20 to 22-segmented, flagellar segments cylindrical. Pronotum punctate, epomia present. Mesoscutum densely punctate, notaulus short or long. Mesopleurum moderately to densely punctate, somewhat mat, sternaulus present (Taiwanese species). Tarsal claw simple. Areolet lacking, second discoidal cell broad, second recurrent vein and basal abscissa of subdiscoideus forming an acute angle. Propodeum finely punctate, well-areolated. Abdominal tergites punctate and sparsely haired. Tergite 1 slender, gradually widened toward apex, glymma deep and large, spiracle behind the middle. Epipleurum of tergite 2 separated from the tergite by a crease. Ovipositor sheath much longer than the depth of abdomen.

Lygurus marjoriae Chiu, sp. nov.

♀: Fore wing (fig. 1c) 4.1 mm. long. Head (fig. 4c) in frontal view about 0.6x as long as wide. Clypeus convex, about 2.9x as wide as long, basal half coarsely punctate, apical half with very few coarse punctures. Malar space moderately densely punctate, about 0.8x as long as basal width of mandible. Face and frons evenly densely punctate. Vertex and temple finely weakly punctate. Occipital carina joining hypostomal carina above mandible by about 0.7x basal width of mandible. Flagellum 22-segmented. Epomia long, distinct but not strong. Pronotum finely weakly sparsely punctate, hind margin with a few short striae. Mesoscutum evenly densely punctate, notaulus long, moderately deep, almost reaching a transverse line between base of tegula. Scutellum evenly densely punctate, lateral carina distinct from base to apex. Mesopleurum weakly mat, finely sparsely punctate except speculum impunctate, the punctures on lower half are coarser and denser, sternaulus short and distinct. Basal abscissa of subdiscoideus about 2.0x as long as the second recurrent vein. Propodeum (fig. 3c) weakly rugose, sparsely punctate, somewhat mat, moderately strongly carinate, spiracle small and circular. Tergite 1 (fig. 4c) slender, with distinct longitudinal striae except basal 0.3 wrinkled, the tergite about 3.4x as long as apical width, median dorsal carina obiterated, dorsolateral carina complete, spiracle slightly behind the middle. Epipleura of tergite 2 (entirely) and tergite 3 (basal 0.3) separated from their tergites by a crease.

Black. Antenna brownish black, mandible (teeth brown), clypeus (basal margin brown), palpi, hind corner of pronotum, tegula, and subtegular ridge, yellow. Face (centrally), facial orbit, frontal orbit and temporal orbit, brownish yellow. Malar space light brown. Legs fulvous to brown, front and middle femora and all tarsi, fuscous. Hind leg with coxa black, first trochanter marked with black, femur fulvous (dorsally dark), tibia (dorsally), and tarsus blackish, base of second to fourth tarsal segments yellow, tarsal claws brown. Tergite 1 black, tergites 2 to 4 dark brown to black, hind margin of tergite 2 and basal margin of tergite 3, brownish yellow. Wing hyaline, pterostigma and venation brownish black. Ovipositor sheath brownish black, ovipositor reddish brown.

Holotype ♀. Meifeng (Nantou), 2,150 m, 3. V. 1983, Henry Townes (American Entomological Institute).

Paratype ♀. Same data as holotype (American Entomological Institute).

This species is characteristic by its clypeus with a distinct transverse groove at midheight, apical margin slightly rounded. Malar space without vertical groove. Areolet lacking. Propodeum well-areolated. Tergite 1 with deep and large glymma, spiracle behind the middle. Hind tarsal claws simple. Ovipositor sheath extraordinary long, about 7.8x longer than its abdominal depth.

This species is named in honor of Mrs. Marjorie Townes.

Genus **EAROBIA** Townes

Earobia Townes, 1951. *In* Townes and Townes, Proc. Ent. Soc. Wash. 53:307.

Type species: *Earobia minor* Townes. Monotypic and original designation.

Echthrolaricobius Perkins, 1958. Entomophaga 3:146.

Type species: *Echtrolaricobius paradoxus* Perkins. Monotypic and original designation.

Fore wing 2.6 mm. long. Head in frontal view wider than long. Clypeus at midheight without a transverse groove. Mandibular teeth subequal in length. Malar space without a vertical groove. Face frons, vertex and temple, mat. Occipital carina rounded medially. Pronotum mat, epomia

present. Mesoscutum mat and punctate, notaulus present, scutellum punctate, sternaulus visible. Areolet sessile, second recurrent vein and basal abscissa of subdiscoideus forming nearly a right angle, pterostigma broad. Propodeum areolate. Hind tarsal claws simple. Tergite 1 short and broad, median dorsal carina present, glymma deep, spiracle before the middle. Epipleurum of tergite 2 separated from the tergite by a crease. Ovipositor sheath in length subequal to the depth of abdomen.

Earobia paradoxus Perkins

Echthrolaricobius paradoxus Perkins, 1958. Entomophaga 3:146. Description. Type ♀, Seegraben near Zurich, Switzerland (BRITISH MUSEUM). Identified from the description.

♀: Fore wing (fig. 1d) 2.6 mm. long. Head (fig. 2d) in frontal view about 0.6x as long as wide. Clypeus mat, coarsely punctate, strongly convex, about 3.7x as wide as long, not separated from face by a groove. Mandible mat and punctate. Malar space mat and punctate, about 1.0x as long as basal width of mandible. Face, frons and vertex mat, without punctures, temple weakly mat, sparsely weakly punctate. Occipital carina roundly arched medially. Flagellum 17-segmented. Pronotum mat, epomia present only its upper part. Mesoscutum mat and punctate, punctures on lateral area more distinct. Scutellum coarsely sparsely punctate, lateral area mat, lateral carina present on basal 0.2. Mesopleurum mat with weak sparse punctures, sternaulus shallow. Second discoidal cell comparatively broad, basal abscissa of subdiscoideus about 1.4x as long as second recurrent vein, nervulus distad to basal vein, nervellus broken below middle. Propodeum (fig. 3d) mat, weakly sparsely punctate, costula absent, basal area and areola fused. Abdominal segments finely sparsely punctate, covered with evenly moderately dense hairs, gradually compressed beyond tergite 3. Tergite 1 (fig. 4d) broad, about 1.5x as long as apical width, weakly mat and sparsely punctate, with numerous longitudinal striae, median dorsal carina distinct. Epipleurum of tergite 2 entirely separated from the tergite by a crease. Ovipositor sheath about 0.9x as long as abdominal depth.

Brownish black to black. Mandible browish yellow except teeth brown. Palpi yellow. Clypeus light brown. Antenna entirely black except scape apically yellow. Legs dark brown to blackish brown with coxae darker. Pterostigma and venation fuscous. Ovipositor fulvous, sheath infuscate.

♂: Unknown.

Specimen examined. 1♀. Meifeng, 2,150 m, 16. IV. 1983, Henry Townes (American Entomological Institute).

This species can be recognized by its body evenly covered with conspicuous pubescence. Head and thorax mat. Pterostigma and second discoidal cell broad. Propodeum without costula, hind tarsal claws simple. Tergite 1 stout, about 1.5x as long as apical width, spiracle before the middle. Ovipositor short.

Genus **PHRUDUS** Foerster

Phrudus Foerster, 1869. Verh. Naturh. Ver. Rheinlande 25:196.

Type species: *Phrudus monilicornis* Bridgman. Included by Dalla Torre, 1901.

Phrudus Bridgman, 1886. Trans. Ent. Soc. London 19:361. Name preoccupied by Foerster, 1869.

Type species: *Phrudus monilicornis* Bridgman. Monobasic.

Ktenostilpnus Strobl, 1901. Mitt. Naturw. Ver. Stiermark 37:256.

Type species: (*Ktenostilpnus aequearticulatus* Strobl) = *monilicornis* Bridgman. Monobasic.

Vendolius Roman, 1914. Arkiv. for Zool. 9(2):35.

Type species: (*Vendolius stilpninus* Roman) = *monilicornis* Bridgman. Monobasic.

Fore wing 1.3–3.6 mm. long. Head in frontal view wider than long, or much longer than wide. Clypeus wide, apical margin somewhat transverse or subtruncate. Malar space without a vertical groove between eye and mandible. Face with sparse to dense punctures. Frons polished with rather sparse punctures. Temple full and wide. Flagellum 12 to 20-segmented, males usually with more segments than females, the segments cylindrical, several segments near apex somewhat moniliform. Mesoscutum with apical and lateral margins upcurved and crenulated, notaulus present or absent. Mesopleurum polished and punctate, partly wrinkled, sternaulus indistinct or absent. Areolet subquadrate, pterostigma broad, second discoidal cell long and narrow, second recurrent vein and basal abscissa of subdiscoideus usually forming a right angle, the latter 2.4–3.0x as long as the former. Propodeum areolated. Hind coxa punctate, hind tarsal claws pectinate with strong pectinae. Tergite 1 usually slender, punctate or with a few longitudinal striae, both sides approximately paralleled each other except apical part, median dorsal carina present, spiracle nearly at middle of the tergite, glymma present. Tergite 2 and its following tergites polished with very few sparse and weak punctures. Epipleurum of tergite 2 separated from the tergite by a crease. Ovipositor sheath in length subequal to the depth of abdomen.

Key to the Taiwanese species of *Phrudus*

1. Head in frontal view 1.0–1.3x as long as wide. Notaulus present. Second pleural area of propodeum with numerous transverse striae. Petiolar area distinctly longer than wide, with extremely narrow base. . . . . ***longius*** Chiu, sp. nov.
   Head in frontal view 0.6–0.8x as long as wide. Notaulus absent or present. Second pleural area of propodeum obscurely punctate, not striate. Petiolar area not as above, mostly subequal in length and width. 2
2. Notaulus absent. Temple moderately densely punctate. Tergite 1 comparatively broad and short, 2.2–2.4x as long as apical width. . . . . ***monilicornis*** Bridgman
   Notaulus present. Temple almost impunctate to finely and sparsely punctate. Tergite 1 narrow and long, 3.0–4.7x as long as apical width. 3
3. Tergite 1 about 3.0x as long as apical width. Median dorsal carinae distinctly closer each other at middle. Flagellum 20-segmented. . . . . ***montanus*** Chiu, sp. nov.
   Tergite 1 about 4.0x or more as long as apical width. Median dorsal carinae not distinctly closer each other at middle. Flagellum 12 to 16-segmented. 4
4. Tergite 2 about 1.4x as long as apical width. Basal transverse carina of propodeum present. . . . . ***angustus*** Chiu, sp. nov.
   Tergite 2 about 0.7x as long as apical width. Basal transverse carina of propodeum absent. . . . . ***linorum*** Chiu, sp. nov.

Phrudus longius Chiu, sp. nov.

♀: Fore wing (fig. 1e) 1.3–1.5 mm. long. Head (fig. 2e) in frontal view erect-rectangular about 1.3x as long as wide. Clypeus weakly convex, about 2.8x as wide as long, separated from face by a distinct groove. Malar space in length subequal to basal width of mandible. Face polished, sparsely punctate. Frons extremely, sparsely, weakly punctate. Temple unusual wide in profile, nearly impunctate, evenly curve backward to occipital carina. Flagellum 12-segmented. Notaulus crenulated. Mesopleurum very finely and sparsely punctate, its lower 0.4 with a few transverse striae, sternaulus absent. Metapleurum punctato-striate. Propodeum (fig. 2e) polished, lateral carina of areola sometimes obscure, petiolar area about 1.8x as long as wide, with coarse surface, second pleural area with

numerous, short, transverse striae. Tergite 1 (fig. 4e) smooth with a few distinct longitudinal striae on apico-laterally, about 3.7–4.5x as long as apical width (the holotype about 4.5x in ratio), median dorsal carina distinct reaching about 0.8x of the tergite. Tergite 2 trapezoid, about 1.6x as long as apical width.

Black. Mouthparts (except mandibular teeth brownish), antenna (except flagellum apically darker), tegula and abdominal tergites beyond tergite 2, light brown. Legs fulvous to light brown. Wings hyaline, pterostigma fuscous, venation fulvous.

♂: Structure and color very similar to female, but differs in frontal view of head about 1.0x as long as wide. Temple roundly curved backward to occipital carina. Flagellum 13-segmented. Tergite 1 3.5–4.3x as long as apical width.

Holotype ♀. Shantimen (Pingtung), 24. III. 1982, K. C. Chou & C. C. Pan.

Paratypes 17♀, 44♂. Chihpen (Taitung): 1♂, 17–18. II. 1982, L. Y. Chou & K. C. Chou. Fuli (Hualien-Tungho, Taitung): 5♀, 7♂, 9–11. XI. 1982, K. C. Chou & S. P. Huang. Kenting (Pingtung): 1♂, 22–26. III. 1982, T. Lin & S. C. Lin; 3♂, 25–28. V. 1982, K. C. Chou & C. C. Pan. Kukuan (Taichung): 730 m, 1♀, 14–17. 1980, K. S. Lin & C. H. Wang. Laii (Pingtung): 1♂, 3. II. 1983, K. C. Chou & S. P. Huang. Maolin (Kaohsiung): 5♂, 26. III. 1982, K. C. Chou & C. C. Pan. Shantimen (Pingtung): 7♀, 15♂, 1–5. III. 1982, K. C. Chou & C. C. Pan; 1♀, 7♂, 31. I-4. II. 1983, K. C. Chou & S. P. Huang; 1♀, 1♂, 16–20. I. 1984, K. C. Chou & C. C. Pan. Tungpu (Nantou): 1,200 m, 1♀, 23–27. VII. 1984, K. C. Chou & C. H. Yang. Wanfeng (Taichung): 1♂, 4–5. IV. 1980, K. S. Lin. Wushe (Nantou): 1,150 m, 1♀, 7–8. X. 1982, K. C. Chou.

The name "*longius*" means longer, referring to its unusual long head.

This species is easily recognized by its body-size smaller, and female head erect-rectangular in frontal view. Temple nearly impunctate. Notaulus present. Tergite 1 slender, about 4.5x as long as apical width, tergite 2 trapezoid, about 1.6x as long as apical width.

Phrudus monilicornis Bridgman

Phrudus monilicornis Bridgman 1886. Trans. Ent. Soc. London 19:361. ♀, ♂ Original description. Types ♀, ♂ Shiere (BRITISH MUSEUM).

♀: Fore wing (fig. 1f) about 3.4 mm. long. Head (fig. 2f) in frontal view transverse-rectangular, about 0.9x as long as wide. Clypeus about 3.0x as wide as long, slightly convex, separated from face by a very shallow groove, with various-sized, sparse to dense punctures. Malar space about 0.8x as long as basal width of mandible. Face rather densely punctate. Frons sparsely punctate, with various-sized punctures. Temple wide and roundly curved backward, with sparse to dense punctures. Falgellum 16 to 17-segmented. Mesoscutum densely punctate, notaulus absent. Mesopleurum moderately to densely punctate except its central part almost impunctate. Scutellum densely punctate. Propodeum (fig. 3f) well-areolate, finely to coarsely punctate, pleural area weakly punctate, without striae, petiolar area nearly quadrate, with moderately dense punctures except those on basal 0.3 are sparser. Tergite 1 (fig. 4f) with very few fine, sparse punctures, the tergite about 2.2x as long as apical width, median dorsal carina lower, broader and shorter than those of *longius*. Tergite 2 transverse, about 0.6x as long as apical width.

Brown to black. Mouthparts (except mandibular teeth brown) and tegula light brown. Abdominal tergite 1 black. Tergite 2 entirely and tergite 3 (except apical 0.3 darker), light brown. The rest tergites light brown to dark brown. Legs light brown. middle and hind coxae or front coxa also dark brown, hind tarsal claws blackish. Wings hyaline, pterostigma fuscous, venation light brown.

♂: Very similar to female, differs in flagellum 19-segmented, tergite 2 about 2.4x as long as apical width, somewhat wrinkled on both sides.

Specimens examined 6♀, 1♂. Meifeng (Nantou): 2,150 m, 1♂, 20–22. VI. 1979, K. S. Lin & B. H. Chen; 1♀, 1♂, 7–9. V. 1981, K. S. Lin & B. H. Chen; 1♀, 19–21. IV. 1983, K. C. Chou & S. P. Huang; 1♀, 8–11. V. 1984, K. C. Chou & C. C. Pan. Tayuling (Hualien): 2,560 m, 3♀, 9–16. VI. 1980, K. S. Lin & B. H. Chen.

This species has its head transverse in frontal view. Temple moderately densely punctate. Notaulus lacking. Tergite 1 comparatively broad, about 2.2x as long as apical width, tergite 2 transverse, about 0.6x as long as apical width.

Phrudus montanus Chiu, sp. nov.

♀: Fore wing (fig. 1g) about 2.6 mm. long. Head (fig. 2g) in frontal view about 0.6x as long as wide. Clypeus about 3.0x as wide as long, with sparse and fine punctures, separated from face by a deep groove. Malar space about 1.0x as long as basal width of mandible. Face moderately densely punctate. Frons as well as temple sparsely to very sparsely finely punctate. Temple wide and roundly curved backward. Flagellum 20-segmented. Notaulus as usual, without carina on the furrow. Mesopleurum evenly convex with fine and sparse punctures except centrally impunctate. Propodeum (fig. 3g) areolated, petiolar area sparsely punctate, nearly as long as wide. Tergite 1 (fig. 4g) about 3.0x as long as apical width, median dorsal carina strong, the carinae distinctly closer to each other at middle. Tergite 2 about 0.6x as long as apical width.

Black. Mouthparts (except mandibular teeth brown) fulvous. Antenna fuscous to blackish. Tegula brownish. Legs light brown, all coxae stained with dark brown. Wings hyaline, pterostigma and venation fulvous.

♂: Unknown.

Holotype ♀. Tayuling (Hualien), 2,560 m, 12–15. IX. 1980, K. S. Lin & C. H. Wang.

The name "*montanus*" means mountain, referring to the collecting locality was in the high mountain.

This species has its head transverse in frontal view. Temple sparsely to very sparsely finely punctate. Notaulus present. Antenna longer, flagellum 20-segmented. Tergite 1 about 3.0x as long as apical width, tergite 2 transverse about 0.6x as long as apical width.

Phrudus angustus Chiu, sp. nov.

♂: Fore wing (fig. 1h) about 2.0 mm. long. Head (fig. 2h) in frontal view nearly as long as wide. Clypeus about 2.6x as wide as long, with sparse and weak punctures, separated from face by a deep groove. Malar space about 1.3x as long as basal width of mandible. Face as well as frons finely sparsely punctate. Temple wide, nearly impunctate, roundly backward to occipital carina. Flagellum 13-segmented. Notaulus with a single carina on the furrow. Mesopleurum finely and sparsely punctate except central part smooth, with a few oblique striae near lower 0.4. Propodeum (fig. 3h) smooth, finely carinated, areola with both the sides open, pleural area without striae, petiolar area strigose, almost as long as wide. Tergite 1 (fig. 4h) polished, impunctate, about 4.7x as long as apical width, median dorsal carina strong except apical 0.25 weaker. Tergite 2 slender, about 1.4x as long as apical width.

Dark brown to black. Mouthparts (except mandibular teeth brown), tegula and legs fulvous. All coxae and hind femur stained with brown. Abdomen black except tergites 1, 2 and basal 0.5 of tergite 3, brown.

♀: Very similar to male in color and structure, but differs in having flagellum 12-segmented, petiolar area longer, about 1.3x as long as wide, abdomen entirely brown, fore wing missing, hind wing broken.

Holotype ♂. Tayuling (Hualien), 2,560 m, 10–15. IX. 1980, Malaise trap.

Paratype ♀. Mucha (Taipei), 8. VIII. 1967, S. H. Lin.

The name "*angustus*" means narrow, referring to the comparatively narrow tergite 2.

This species can be recognized by its propodeum with incomplete areola and strigose petiolar area. Tergite 1 long and narrow, about 4.7x as long as apical width, tergite 2 trapezoid, about 1.4x as long as apical width.

Phrudus linorum Chiu, sp. nov.

♂: Fore wing (fig. 1i) about 2.0 mm. long. Head (fig. 2i) in frontal view about 0.5x as long as wide. Clypeus about 3.3x as wide as long, sparsely coarsely punctate, separated from face by a shallow groove. Malar space about 1.0x as long as basal width of mandible. Face sparsely, weakly punctate. Frons sparsely punctate with various-sized punctures. Temple wide, sparsely punctate. Flagellum 16-segmented. Notaulus with a single carina on the furrow. Mesopleurum sparsely, finely punctate with central part smooth, the punctures on lower 0.5 sparser. Propodeum (fig. 3i) sparsely punctate, basal transverse carina absent, pleural area without striae, petiolar area sparsely punctate about 1.4x as long as wide. Tergite 1 (fig. 4i) about 4.0x as long as apical width, median dorsal carina nearly reaching apex, the carinae paralleled each other. Tergite 2 transverse about 0.7x as long as apical width.

Dark brown to black. Mouthparts (except mandibular teeth brown), antenna and tegula, fuscous. Abdomen black except tergite 1 and basal 0.5 of tergite 2, dark brown. Legs fulvous, with all coxae and hind femur, brownish. Wings hyaline, pterostigma and venation fuscous.

♀: Unknown.

Holotype ♂. Meifeng (Nantou), 2,150 m, 7–9. V. 1981, K. S. Lin & S. C. Lin.

The name "*linorum*" is derived from the last name of the specimen collectors, Messrs. K. S. Lin and S. C. Lin.

This species is characterized by its propodeum lacking basal transverse carina. Tergite 1 about 4.0x as long as apical wide, tergite 2 transverse, about 0.7x as long as apical width.

Genus **ASTRENIS** Foerster

Astrenis Foerster, 1868. Verh. Naturh. Ver. Rheinlande 25:148.

Type species: *Hambergiella sinuata* Roman. Designated by Perkins, 1962.

Orona Cameron, 1905. Invertebrata Pacifica 1:131. Name preoccupied by Haeckel, 1887.

Type species: *Orona petiolaris* Cameron. Monobasic.

Mengersenia Schmiedeknecht, 1907. Die Hymenopteren Mitteleuropas, p. 606.

Type species: *Mengersenia paradoxa* Schmiedeknecht. Monobasic.

Hambergiella Roman, 1909. *In* Hamberg: Naturwissenschaftliche Untersuchungen des Sarekgebirges in Schwedisch-Lappland 4:359.

Type species: *Hambergiella sinuata* Roman. Monobasic.

Fore wing 2.1–2.8 mm. long. Head in frontal view wider than long. Clypeus wide and convex, separated from face by a groove, apical margin somewhat transverse. Malar space without a vertical groove between eye and mandible. Face strongly convexed centrally, usually finely punctate as well

as frons. Temple wide, not swollen, with extremely fine punctures and sparse or dense hairs. Flagellum 15–20 segmented, males usually with more segments than the females, the segment cylindrical, several segments near apex somewhat moniliform. Epomia long, usually almost reaching the front edge of mesoscutum. Notaulus deep. Mesoscutum with anterior and lateral margins reflexed and crenulated. Mesopleurum usually polished and nearly impunctate except upper part evenly moderately densely punctate, with a transverse depression at its midheight, lower 0.2 area usually with a few distinct striae, sternaulus absent. Metapleurum mat. Propodeum areolated, with strong carina and sparse, weak punctures. Areolet lacking, second discoidal cell long and narrow, pterostigma narrow, nervulus nearly opposite, or slightly distad to basal vein, second recurrent vein and basal abscissa of subdiscoideus forming a slightly acute angle, the latter about 3.6x as long as the former, nervellus not broken. Hind coxa with granulate surface, hind tarsal claws pectinate. Tergite 1 slender, widened at middle and apex, median dorsal carina present, with distinct longitudinal striae, spiracle slightly before the middle, glymma present. Tergite 2 and its following tergites polished, with extremely few and fine punctures. Epipleurum of tergites 2 not separated from the tergite by a crease. Ovipositor sheath in length subequal to the depth of abdomen.

Key to the Taiwanese species of *Astrenis*

Temple sparsely haired. Medio-posteriorly of mesoscutum usually with 1 to 3 short, longitudinal striae, if not so, temple must be sparsely haired. Male head black in color. Hind tarsal claws dark brown. . . . . ***granum*** Chiu, sp. nov.

Temple densely haired. Medio-posteriorly of mesoscutum without longitudinal striae. Male head yellow to brown never black in color. Hind tarsal claws colorless. . . . . ***densa*** Chiu, sp. nov.

Astrenis granum Chiu, sp. nov.

♀: Fore wing (fig. 1j) 2.2–2.9 mm. long. Head (fig. 2i) in frontal view about 0.6x as long as wide. Clypeus about 2.3x as wide as long with very few scattered punctures, separated from face by a distinct groove. Malar space distinctly mat, about 0.6x as long as basal width of mandible. Face, frons and temple with very few, sparse and weak punctures, the latter rather sparsely haired. Flagellum 15 to 17-segmented. Mesoscutum (fig. 5a) sparsely finely punctate, its medio-posteriorly usually with 1–3 short striae. Mesopleurum polished, with very few punctures scattered on its upper 0.25, with a transverse depression carrying a distinct carina at its midheight. Propodeum as in fig. 5b, petiolar area weakly and extremely sparsely punctate. Hind tarsal claws with strong and dark colored pectinae. Tergite 1 (fig. 5c) 4.0–5.0x as long as apical width (the holotype about 4.4x in ratio).

Dark brown to black. Mouthparts (except mandibular teeth brown), clypeus, scape, pedicel and 3 basal segments of flagellum, light brown. Tergite 1 entirely black, tergite 2 and following tergites gradually from light brown to black, all legs (except hind leg with coxa dorsally, dorso-apical 0.5 of tibia, and tarsus, fuscous), and ovipositor fulvous. Wing hyaline, pterostigma and venation fuscous.

♂: Very similar to female in structure and color pattern, except flagellum having 17 to 19-segmented.

Holotype ♀. Tsuifeng (Nantou), 2,300 m, 6. V. 1981, K. S. Lin & S. C. Lin.

Paratypes 118♀, 44♂. Anmashan (Taichung): 2,275 m, 1♀, 6–9. VII. 1979, L. Y. Chou. Meifeng (Nantou): 2,230m, 1♀, 10. V. 1979, K. C. Chou; 2,130 m, 2♀, 2–4. VI. 1980, L. Y. Chou & C. C. Chen; 2,150 m, 23♀, 12♂, 7–9. V. 1981, K. S. Lin & S. C. Lin; 2♀, 24–26. VI. 1981, K. S. Lin & W. S. Tang; 2♀, 1♂, 22. V. 1982, L. Y. Chou; 5♀, 7♂, 19–21. IV. 1983, K. C. Chou & S. P.

Huang; 1♀, 22–23. VI. 1983, K. S. Lin & S. C. Lin; 13♀, 13♂, 8–11. V. 1984, K. C. Chou & C. C. Pan. Tayuling (Hualien): 2,560 m, 1♀, 24–26. VI. 1977, K. S. Lin; 2♀, 1♂, 9–16. VI. 1980, K. S. Lin & B. H. Chen; 1♀, 1♂, 10–16. VI. 1980, Malaise trap; 1♀, 12–15. IX. 1980, K. S. Lin & C. H. Wang; 1♀, 6–9. IX. 1983, L. Y. Chou & K. C. Chou. Tsuifeng (Nantou): 2,300 m, 2♀, 4♂, 3. VI. 1980, L. Y. Chou & C. C. Chen; 18♀, 2♂, 8. V. 1981, K. S. Lin & S. C. Lin; 6♀, 25–27. VI. 1981, K. S. Lin & W. S. Tang; 1♀, 23. V. 1982, L. Y. Chou; 1♀, 16. VII. 1982, S. C. Lin & C. N. Lin; 3♀, 1–3. IX. 1982, L. Y. Chou & K. C. Chou; 15♀, 1♂, 23–25. VI. 1983, K. S. Lin & S. C. Lin; 4♀, IV. 1984, Malaise trap; 3♀, V. 1984, Malaise trap; 1♀, VI. 1984, Malaise trap; 3♀, 5. VIII. 1984, K. S. Lin. Wushe (Nantou): 1,150 m, 6♀, 2♂, 6–11. V. 1981, K. S. Lin & S. C. Lin.

The name "*granum*" means pellet or grain, referring to its hind coxa with granulate surface.

This species can be recognized by the head entirely black. Temple with sparse and long hairs. Mesoscutum usually with 1 to 3 short striae on its medio-posteriorly.

Astrenis densa Chiu, sp. nov.

♀: Fore wing (fig. 1k) 2.2–2.4 mm. long. Head (fig. 2k) in front view about 0.6x as long as wide. Clypeus about 2.5x as wide as long, sparsely punctate, but slightly denser than those of *A. granum*, separated from face by a distinct groove. Malar space obscurely mat, about 0.6x as long as basal width of mandible. Face sparsely, weakly punctate. Temple moderately punctate with dense hairs. Flagellum 15 to 18-segmented. Mesoscutum (fig. 5d) finely moderately densely punctate, its medio-posteriorly without longitudinal carinae. Mesopleurum dorsally scattered with fine and weak punctures, with a transverse smooth depression at midheight not carrying a carina. Propodeum as in fig. 5e, petiolar area uniformly sparsely punctate. Hind tarsal claws pectinate, its pectinae somewhat soft and colorless. Tergite 1 (fig. 5f) about 5.0x as long as apical width (the holotype about 4.4x in ratio).

Brown to dark brown. Mouthparts (except mandibular teeth brown) face, clypeus and legs (except hind coxa dorsally, hind tibia and hind tarsus, blackish), yellow to fulvous. Abdomen entirely black sometimes with tergites 2 and 3 brown, ovipositor fulvous. Wings hyaline, pterostigma and venation fuscous.

♂: Very similar to female, but differs in having flagellum 17 to 20-segmented, fore wing 2.1–2.6 mm. long, head brown to dark brown, sometimes fulvous except vertex brown.

Holotype ♀. Meifeng (Nantou), 2,150 m, 24–26. VI. 1981, K. S. Lin & W. S. Tang.

Paratypes 12♀, 22♂. Alisan (Chiayi): 2,400 m, 1♂, 5–9. VIII. 1981, L. Y. Chou & S. C. Lin. Anmashan (Taichung): 2,275 m, 1♂, 6–9. VII. 1979, L. Y. Chou. Meifeng (Nantou): 2,130 m, 1♂, 10. V. 1979, K. C. Chou; 2,150m, 1♂, 20–22. VI. 1979, K. S. Lin & B. H. Chen; 2,130 m, 1♀, 2–4. VI. 1980, L. Y. Chou & C. C. Chen; 2,150 m, 1♀, 26. VIII. 1981, K. S. Lin & C. H. Wang; 1♂, 7–9. V. 1981, K. S. Lin & S. C. Lin; 1♀, 3♂, 24–26. VI. 1981, K. S. Lin & W. S. Tang; 2,250 m, 1♂, 31. VII-2. IX. 1982, L. Y. Chou & K. C. Chou; 2,150 m, 3♀, 5♂, 22–26. VI. 1983, K. S. Lin & S. C. Lin. Sengkuang (Taichung): 1,850 m, 1♀, IX. 1968, K. S. Lin; 1♂, 15–17. VIII. 1984, K. C. Chou. Tayuling (Hualien): 2,560 m, 1♀, 9–16. VI. 1980, K. S. Lin & B. H. Chen; 2♀, 5♂, 12–15. IX. 1980, K. S. Lin & C. H. Wang; 1♂, 6–9. IX. 1983, L. Y. Chou & K. C. Chou. Tsuifeng (Nantou): 2,300 m, 1♀, 1–3. IX. 1982, L. Y. Chou & K. C. Chou; 1♀, V. 1984, Malaise trap; 1♂, 23. VII. 1984, K. S. Lin.

The name "*densa*" means thick, referring to the densely haired temple.

This species can be recognized by the head brown to dark brown. Temple with dense and short hairs. Mesoscutum without striae on its medio-posteriorly.

ACKNOWLEDGEMENTS

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臺灣產福姬蜂亞科之分類
(膜翅目：姬蜂科)

邱瑞珍　翁振宇

中文摘要

福姬蜂亞科(Subfamily Phrudinae)乃姬蜂科中之一小科。體型甚小，僅知其係甲蟲類昆蟲之內寄生(internal parasitoid)。該亞科姬蜂全球記載10屬(genus)，零星分布於舊北區(Palearctic Region)，新北區(Nearctic Region)，新熱帶區(Ethiopian Region)，及東洋區(Oriental Region)。本省尚無記錄。

本文記載本省產之福姬蜂亞科5屬、11種內含2新記錄種(new record)，*Phrudus monilicornis* Bridgman 與 *Earobia paradoxus* Perkins，及9新種(new species)，分別爲 *Brachyscleroma townesi* Chiu, *B. umbilici* Chiu; *Lygurus marjoriae* Chiu; *Phrudus longius* Chiu, *P. montanus* Chiu, *P. angustus* Chiu, *P. linorum* Chiu; *Astrenis granum* Chiu及*A. densa* Chiu. 全部標本均從本省高山森林用掃網採得，而*L. marjoriae* Chiu與*E. paradoxus* Perkins係借自美國昆蟲學研究所，其餘標本均保存於臺灣省農業試驗所昆蟲標本館。

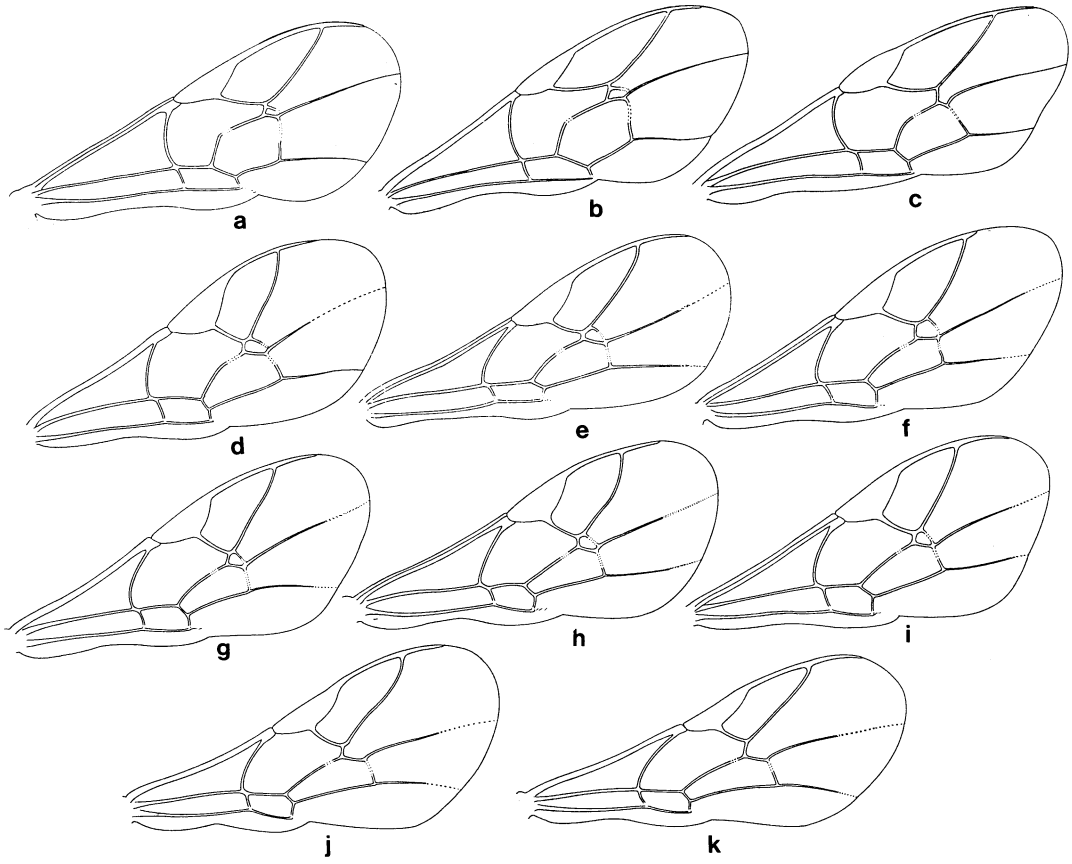

Fig. 1. Fore wings: a. *Brachyscleroma townesi* Chiu, sp. nov. b. *B. umbilici* Chiu, sp. nov. c. *Lygurus marjoriae* Chiu, sp. nov. d. *Earobia paradoxus* Perkins. e. *Phrudus longius* Chiu, sp. nov. f. *P. monilicornis* Bridgman. g. *P. montanus* Chiu, sp. nov. h. *P. angustus* Chiu, sp. nov. i. *P. linorum* Chiu, sp. nov. j. *Astrenis granum* Chiu, sp. nov. k. *A. densa* Chiu, sp. nov.

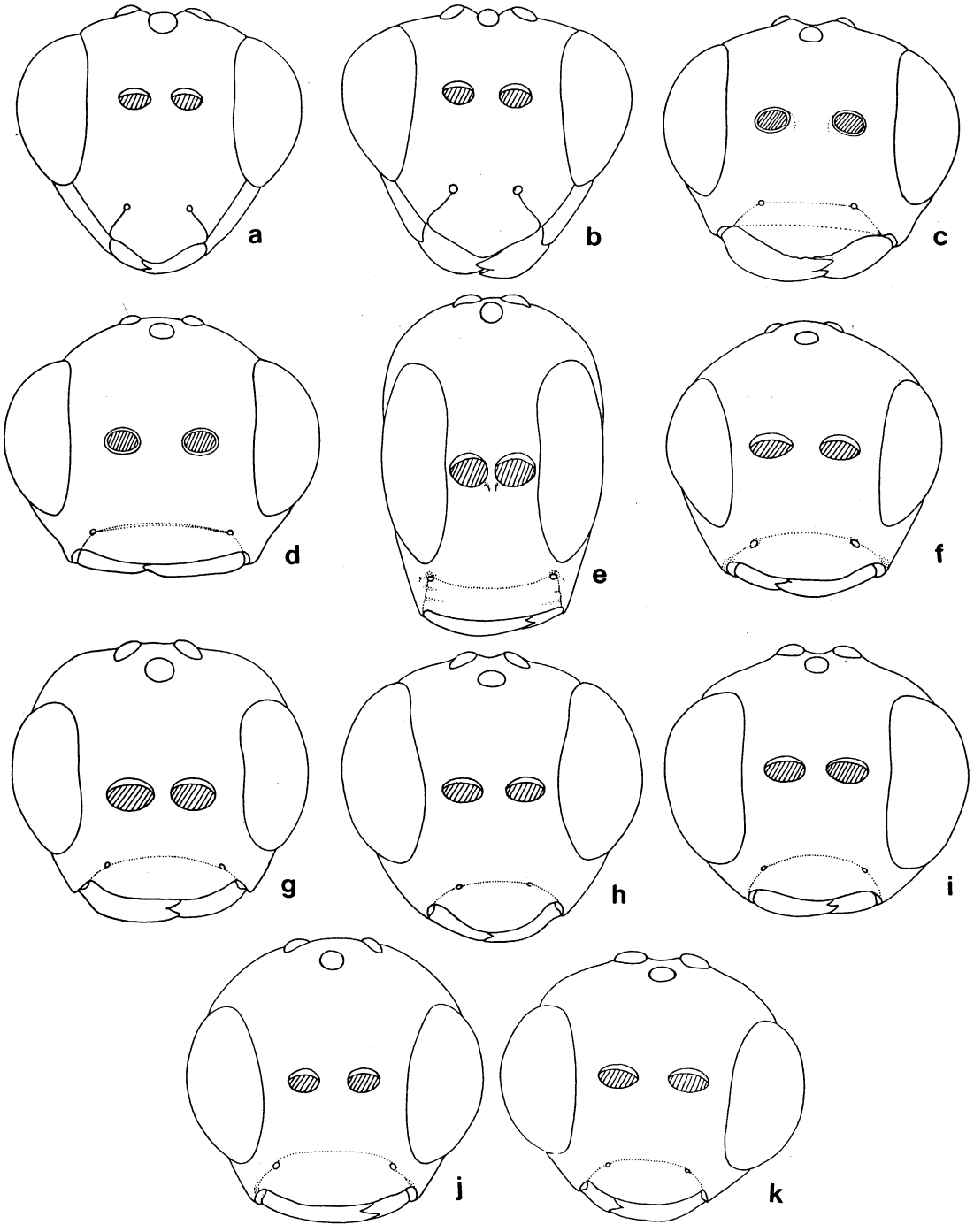

Fig. 2. Heads: a. *Brachyscleroma townesi* Chiu, sp. nov. b. *B. umbilici* Chiu, sp. nov. c. *Lygurus marjoriae* Chiu, d. *Earobia paradoxus* Perkins. e. *Phrudus longius* Chiu, sp. nov. f. *P. monilicornis* Bridgman. g. *P. montanus* Chiu, sp. nov. h. *P. angustus* Chiu, sp. nov. i. *P. linorum* Chiu, sp. nov. j. *Astrenis granum* Chiu, sp. nov. k. *A. densa* Chiu, sp. nov.

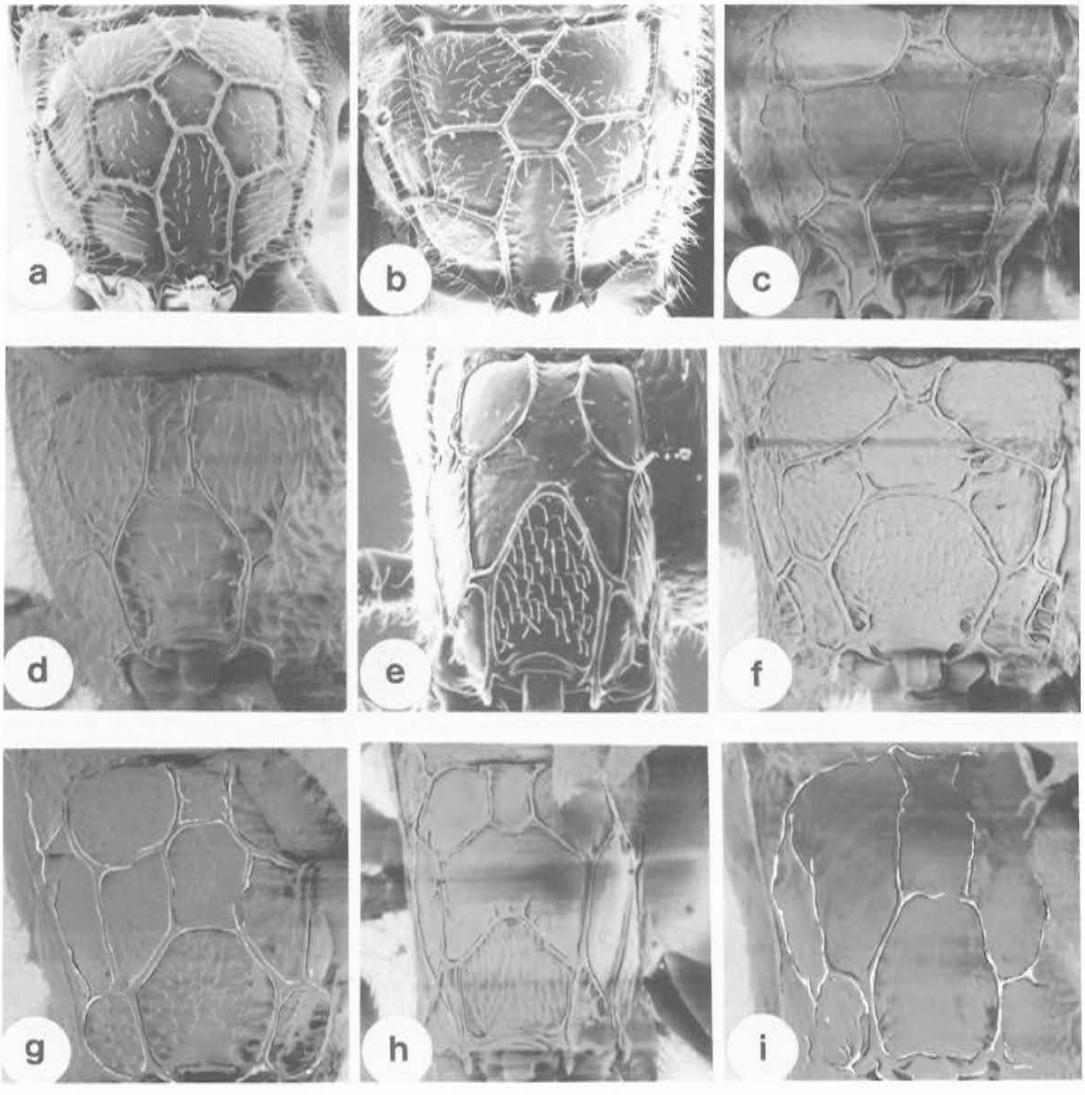

Fig. 3. Propodeums: a. *Brachyscleroma townesi* Chiu, sp. nov. b. *B. umbilici* Chiu, sp. nov. c. *Lygurus marjoriae* Chiu, sp. nov. d. *Earobia paradoxus* Perkins. e. *Phrudus longius* Chiu, sp. nov. f. *P. monilicornis* Bridgman. g. *P. montanus* Chiu, sp. nov. h. *P. angustus* Chiu, sp. nov. i. *P. linorum* Chiu, sp. nov.

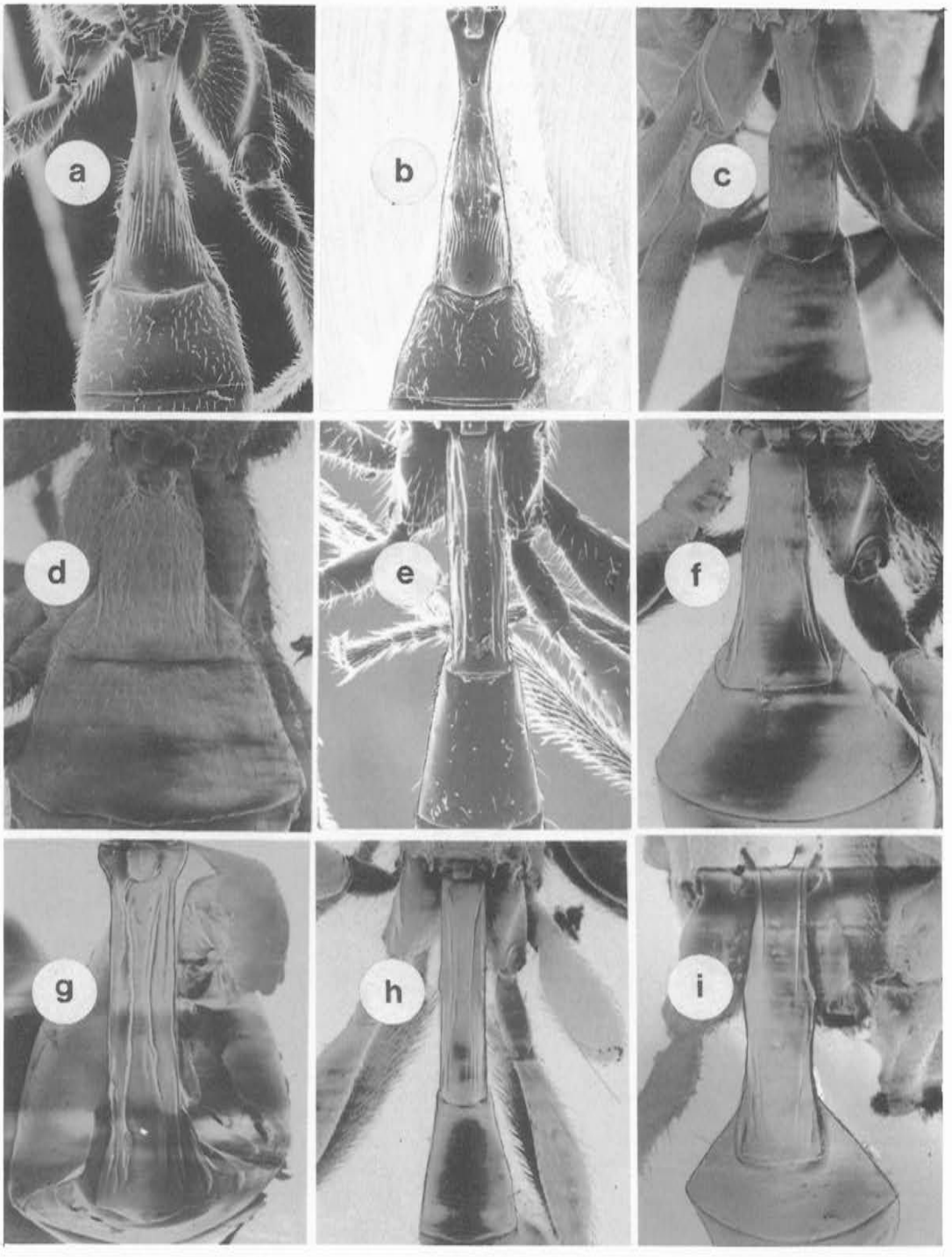

Fig. 4. Abdominal tergites 1 and 2: a. *Brachyscleroma townesi* Chiu, sp. nov. b. *B. umbilici* Chiu, sp. nov. c. *Lygurus marjoriae* Chiu, sp. nov. d. *Earobia paradoxus* Perkins. e. *Phrudus longius* Chiu, sp. nov. f. *P. monilicornis* Bridgman. g. *P. montanus* Chiu, sp. nov. h. *P. angustus* Chiu, sp. nov. i. *P. linorum* Chiu, sp. nov.

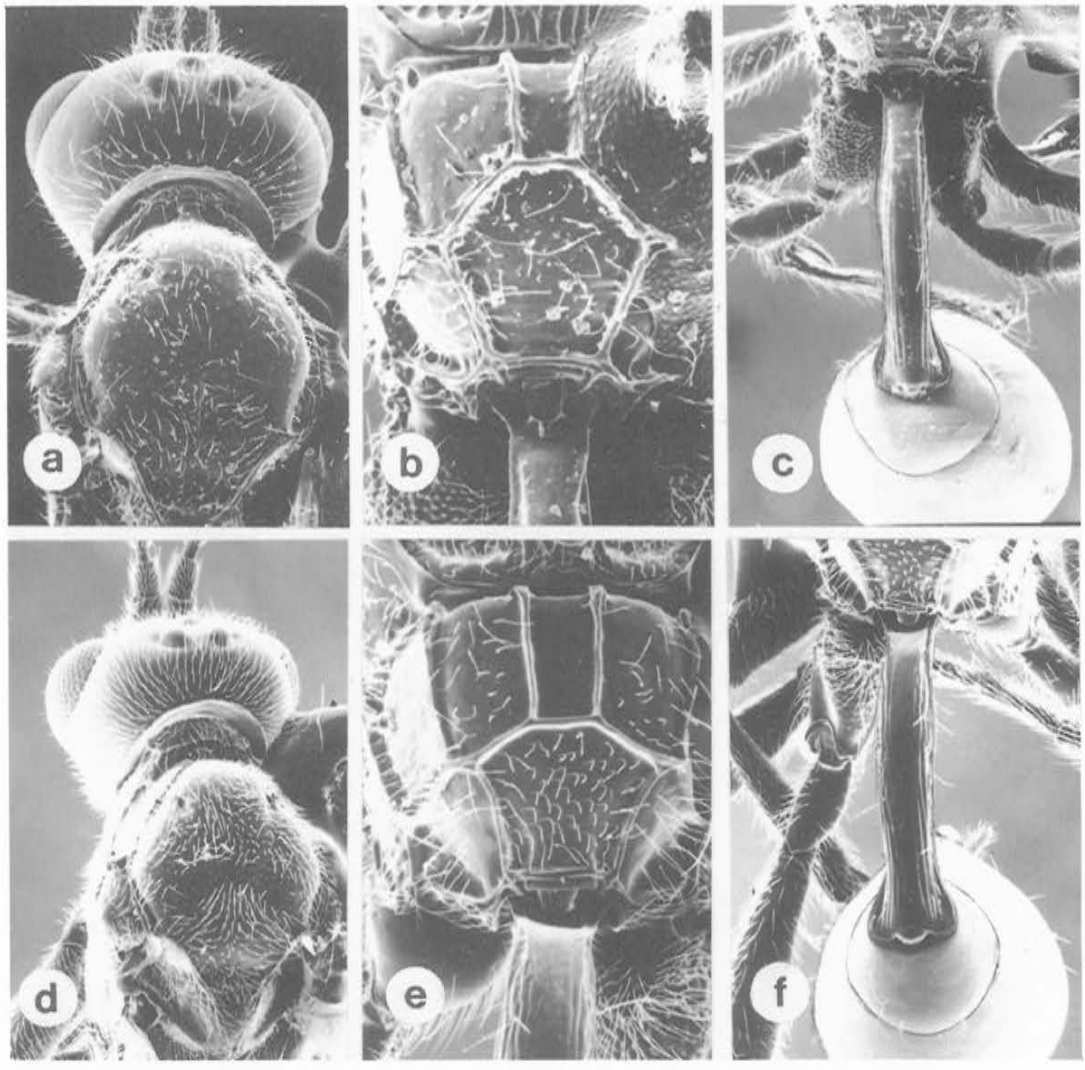

Fig. 5. *Astrenis granum* Chiu, sp. nov: a. Head and mesoscutum. b. Propodeum. c. Abdominal tergites 1 to 3. *A. densa* Chiu, sp. nov: d. Head and mesoscutum. e. Propodeum. f. Abdominal tergites 1 to 3.

Taiwan Agric. Res. Inst., Spec. publ. No. 22: 19–39 23 May 1987

THE GENUS *ARIDELUS* OF TAIWAN (HYMENOPTERA: BRACONIDAE: EUPHORINAE)[1]

by
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Abstract: Nine species of *Aridelus* (Hymenoptera: Braconidae: Euphorinae) are reported in this paper. Seven species: *Aridelus antennatus*, *A. destitutus*, *A. longius*, *A. reticulatus*, *A. taiwanus*, *A. tsuifengensis* and *A. tungpuensis* are new to science. *Aridelus flavicans* Chao is new to Taiwan. All Taiwanese species of *Aridelus* are keyed, described and fully illustrated. A key to the genera of Euphorinae of Taiwan is also presented.

INTRODUCTION

Shenefelt (1969) included 35 genera and over 550 species of parasitic wasps in the subfamily Euphorinae. According to Shaw's analysis (1985), he placed *Meteorus* in a separate subfamily (Meteorinae), and treated it as the sister group of all the remaining euphorine genera. He included 32 genera in Euphorinae.

The monophyly of the subfamily Euphorinae is indicated by the following synapomorphies: loss of the final ectoparasitic phase in larval development, short, simple, toothless mandible and disc-shaped antenna of larvae; development of parasitism of adults; reduction of tergal setae to a single subapical row per tergite; reduction of the maxillary palpi to 5 segments or less and strong curvature of the apical radial segment (Capek, 1970; Achterberg, 1984; Shaw, 1985).

Most braconid subfamilies are restricted to parasitism of a single host order, but the euphorines have been associated with seven: Orthoptera, Hemiptera, Psocoptera, Neuroptera, Coleoptera, Lepidoptera and Hymenoptera. The unusual feature of parasitism of adult insects is common within the Euphorinae (Shaw, 1985).

The euphorine fauna of Taiwan is poorly studied now, only 6 genera and 5 species are recorded (Papp, 1962, 1965; Chou, 1980, 1981, 1986; Chiu et al., 1981). In this paper 10 genera and 8 species are added to the euphorine fauna of Taiwan. All the specimens used in this study are deposited in the insect collection of the Taiwan Agricultural Research Institute.

Synoptic list of genera

(Those marked with an asterisk are new records for Taiwan)

Tribe Perilitini Foerster
**Perilitus* Nees

Tribe Microctonini Shaw
**Microctonus* Wesmael

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Tribe Dinocampini Shaw
Centistina Enderlein
Dinocampus Foerster
Tribe Euphorini Foerster
Chrysopophthorus Goidanich
**Wesmaelia* Foerster
Aridelus Marshall
Leiophron Nees
**Holdawayella* Loan
**Euphoriella* Ashmead
**Streblocera* Westwood
Tribe Centistini Capek
**Centistes* Haliday
Tribe Loxocephalini Shaw
Loxocephalus Foerster
Tribe Cosmophorini Muesebeck & Walkley
**Cosmophorus* Ratzeburg
Tribe Syntretini Shaw
Syntretomorpha Papp
**Syntretus* Foerster

Key to genera of Euphorinae and Meteorinae of Taiwan

(Modified from Shaw, 1985)

1. Second intercubitus of fore wing present, thus second cubital cell present, variously shaped. 2
– Second intercubitus of fore wing absent, thus second cubital cell absent. 4
2. Petiole more than 3 times broader apically than basally, not fused below, the sides sometimes meeting medially or through entire basal half; mandibles overlapping for at most half mandible length. . . . . ***Meteorus***
– Petiole nowhere more than 3 times basal width, fused below; mandibles overlapping for at least 3/4 mandible length. 3
3. Mesonotum areolate, obscuring the notauli; shortest distance between eyes of female greater than clypeus width; malar suture absent. . . . . ***Aridelus***
– Mesonotum punctate, the notauli distinct; shortest distance between eyes of female equal to or less than clypeus width; malar suture present. . . . . ***Chrysopophthorus***
4. Basal width of petiole euqal to or greater than half propodeum width; glymma present as a deep basal pit; petiolar spiracles anterior to middle; radius fully developed. . . . . ***Centistes***
– Basal width of petiole less than half propodeum width; glymma absent or, if present then only a shallow depresion and located nearer to middle of petiole; petiolar spiracles near middle or behind middle, or if anterior to middle then glymma absent and radius partly effaced. . 5
5. First cubital abscissa present, or if absent then first intercubitus and recurrent vein also absent. 6
– First cubital abscissa absent, first intercubitus and recurrent vein present. 12
6. Petiole apically at least 4 times broader than basal width, sculptured dorsally, not fused ventrally. 7
– Petiole apically at most 3 times broader than basal width, sculptured or smooth dorsally, sometimes fused ventrally. 9
7. Scape length twice scape width or less. . . . . ***Perilitus***
– Scape length 3 times scape width or greater. 8
8. Petiolar sculpture rugo-punctate. . . . . ***Dinocampus***
– Petiolar sculpture costate. . . . . ***Centistina***
9. Radius fully developed and distinct throughout its length; first cubital abscissa, if present, straight; nervulus postfurcal relative to basal vein. 10
– Radius at least partly effaced apically with some portion absent; first cubital abscissa curved; nervulus intersitial with basal vein. 11

10. Petiole not fused ventrally or fused only basally. ..... ***Leiophron***
– Petiole entirely fused ventrally. ..... ***Wesmaelia***
11. Petiole smooth and polished dorsally; propodeum with a postero-medial depression; shortest distance between eyes greater than clypeus width; eyes apparently glabrous; malar suture absent. ..... ***Holdawayella***
– Petiole sculptured dorsally; propodeum without a postero-medial depression; shortest distance between eyes less than clypeus width; eyes minutely, but distinctly, setose; malar suture short. ..... ***Euphoriella***
12. Tarsal claws cleft; brachius absent; medius absent; petiole entirely fused ventrally. 13
– Tarsal claws simple; brachius sclerotized or at least infumate in basal 1/3–1/2; medius present; petiole not fused ventrally or fused only basally. 14
13. Notauli present; mesonotum punctate; fronto-clypeal suture effaced, not even indicated by a depression. ..... ***Syntretomorpha***
– Notauli absent; mesonotum smooth and shining at least apically; fronto-clypeal suture present, at least indicated by a depression. ..... ***Syntretus***
14. Mandibles nearly as wide apically as basal width, with an oral incision between clypeus and mandibles even when mandibles closed; scrobes prominent, anterior margin raised in two sharp points. ..... ***Cosmophorus***
– Mandibles gradually narrower apically, or without an oral incision when mandibles closed; scrobes not prominent, or if so then margin even and without points. 15
15. Scape length 5 times scape width or greater. ..... ***Streblocera***
– Scape length twice scape width or less. 31
16. Eyes of female bulging anteriorly beyond frons; metafemur length/width greater than 6; abdomen beyond petiole compressed, less than half as wide as prepodeum; vertex and mesonotum rugulose. ..... ***Loxocephalus***
– Eyes of female not bulging beyond frons; metafemur length/width less than 6; abdomen beyond petiole not compressed, about as wide as propodeum; vertex and mesonotum punctate. ..... ***Microctonus***

Genus **ARIDELUS** Marshall

Aridelus Marshall, 1887. Trans. Ent. Soc. London 1887:66.
Type species: *Aridelus bucephalus* Marshall. Monobasic.
Helorimorpha Schmiedeknecht, 1907. Hym. Mitteleuropas, p. 523.
Type species: *Helorimorpha egregia* Schmiedeknecht. Monobasic.
Strictometeorus Cameron, 1909. Soc. Ent. Steglitz 24:9.
Type species: *Strictometeorus rufus* Cameron. Monobasic.
Erythrometeorus Cameron, 1911. Timehri: J. R. Agr. & Commerc. Soc. British Guiana 1:317.
Type species: *Erythrometeorus reticulatus* Cameron. Monobasic.
Scipolabia Enderlein, 1920. Arch. f. Naturgesch. 84:220.
Type species: *Scipolabia reticulata* Enderlein. Original designation.
Arideloides Papp, 1974. Proc. Hawaiian Ent. Soc. 21:443.
Type species: *Arideloides niger* Papp.

The genus *Aridelus* is characterized by the areolate thoracic sculpture and the pointed apical flagellomere. Its hosts are nymphs and adults of Pentatomidae. More than 31 species have been

recorded in the world. So far as I am aware only one species of this genus have been known to occur in Taiwan. In the present paper are added to the fauna of Taiwan eight other species, of which seven are new to science.

Shaw (1985) indicated the synapomorphies of this genus as follows: shortest distance between eyes greater than clypeus width; median frontal carina extending to median ocellus; interantennal distance 2 times socket width; apical flagellomere pointed; flagellum 16-segmented; malar space 1/4 to 1/2 eye height; malar suture absent; mesonotum, mesopleuron and propodeum mostly areolate; radiella and cubitella present, darkly infumated; ovipositor and sheaths shorter than 1/4 petiole length.

Key to species of *Aridelus* from Taiwan

1. Occiput carina completely margined; median frontal carina distinctly flaky, or frons with two submedian longitudinal carinae. 2
– Occiput carina effaced dorsally; median frontal carina more or less wider and lower 6
2. Head yellowish brown; thorax yellowish brown or dark brown to black. 3
– Head and thorax black. 5
3. Thorax yellowish brown. . . . . ***flavicans*** Chao
– Thorax at least dark brown. 4
4. Intertentorial line 1.3 times tentorial-ocular line; stemmatiacum dark brown. . . . . ***taiwanus*** Chou, sp. nov.
– Intertentorial line 2.8 times tentorial-ocular line; stemmatiacum yellowish brown. . . . . ***longius*** Chou, sp. nov.
5. Recurrent vein distinctly antefurcal; fore wing with 2 fuscous bands. . . . . ***rutilipes*** Papp
– Recurrent vein interstitial or postfurcal; fore wing without fuscous band. . . . . ***reticulatus*** Chou, sp. nov.
6. First flagellomere 2.6 times as long as its basal width; preapical flagellomere as long as its width. . . . . ***tsuifengensis*** Chou, sp. nov.
– First flagellomere more than 3.3 times as long as its basal width; preapical flagellomere longer than its width. 7
7. First flagellomere 4.4 times as long as its basal width; dorsal length of eye 1.0 times temple. . . . . ***antennatus*** Chou, sp. nov.
– First flagellomere 3.3–3.7 times as long as its basal width; dorsal length of eye 1.6 times temple. 8
8. Intertentorial line 2.2–2.8 times tentorial-ocular line; 2nd intercubitus postfurcal. . . . . ***destitutus*** Chou, sp. nov.
– Intertentorial line 1.7 times tentorial-ocular line; 2nd intercubitus interstitial. . . . . ***tungpuensis*** Chou, sp. nov.

Aridelus rutilipes Papp
(Figs. 6, 15, 24, 33, 42, 51, 60, 69, 78, 87)

Aridelus rutilipes Papp, 1965. Acta Zool. Hung. 11(1–2):187. – – Chao, 1974. Acta Ent. Sinica 17(4):455.

Female: Head 1.8 times as broad as its length and 1.2 times broader than mesonotum, hairy; dorsal length of eye 1.0 times temple. Malar space 0.45 times as long as eye height. Intertentorial line 2.0 times tentorial-ocular line. Face 0.6 times as high as its breadth and 0.6 times as wide as

head. Clypeus and face punctulate; frons somewhat punctate-reticulate, median frontal carina flaky; vertex and temple densely punctate. Occiput carina completely margined. Distance between hind ocelli 0.5 times the distance between hind ocellus and eye; and 2.0 times the width of hind ocellus. First flagellomere 4.8 times as long as its basal width and 1.2 times as long as 2nd; preapical segment 1.8 times as long as wide.

Thorax and propodeum areolate. Radius distinct; radial cell 0.7 times as long as stigmal length. Second intercubitus postfurcal, recurrent vein distinctly antefurcal. Petiole 5.6 time as long as apical width. Petiole and the following tergites smooth and shining.

Black; mandible brownish, more or less darker basally, apex of mandible brown, palpi yellowish. Antenna and legs brownish, apex of flagellum darker, 5th tarsi and claws darker. Tegula brown. Wings hyaline with two fuscous bands; stigma and veins dark brown. Ovipositor sheath black.

Length: Body, 4.8–6.2 mm; antenna, 3.6–4.2 mm; fore wing, 3.9–4.5 mm; ovipositor sheath, 0.5 mm.

Male: Simliar to the female.

Specimens examined: Paling 800 m, Taoyuan, 2♀, 3–5. V. 1983 (K. C. Chou & C. C. Pan). Kukuan 730 m, Taichung, 1♀, 14–17. X. 1980 (K. S. Lin & C. H. Wang). Chiapaotai 750 m, Taichung, 3♀, 1♂, 14–18. X. 1980 (K. S. Lin & C. H. Wang). Meifeng 2,150 m, Nantou, 1♀, 5–9. X. 1980 (C. C. Chen & C. C. Chien). Tungpu 1,200 m, Nantou, 1♂, 25–29. IX. 1980 (L. Y. Chou & T. Lin), 2♂, 5–8. X. 1981 (T. Lin & W. S. Tang), 2♀, 1♂, 18–23. XI. 1981 (T. Lin & W. S. Tang), 1♀, 2♂, 19–23. VII. 1982 (L. Y. Chou & T. Lin), 1♀, 18–21. X. 1982 (K. C. Chou & S. C. Lin), 1♀, 1♂, 22–25. XI. 1982 (K. C. Chou & S. P. Huang), 3♂, 10–14. I. 1983 (K. C. Chou & S. P. Huang), & 2♀, 20–24. VI. 1983 (K. C. Chou & C. Y. Wong).

The specimens examined differs from Papp's original description (1965) of *A. rutilipes* Papp in the radius distinct in almost all the specimens except 1 male specimen colorless. But I think these specimens may be conspecific with *A. rutilipes* Papp.

Aridelus flavicans Chao
(Figs. 3, 12, 21, 30, 39, 48, 57, 66, 75, 84)

Aridelus flavicans Chao, 1974. Acta Ent. Sinica 17(4):455.

Female: Head 1.9 times as broad as its length and 1.2 times broader than mesonotum, hairy; dorsal lenghth of eye 1.2 times temple. Malar space 0.55 times as long as eye height. Intertentorial line 1.4 times tentorial-ocular line. Face 0.5 times as high as its breadth and 0.6 times as wide as head. Clypeus densely punctate, face densely punctate to slightly rugulose above; frons somewhat punctate-reticulate, median frontal carina flaky; vertex and temple densely punctate. Occiput carina completely margined. Distance between hind ocelli 0.4 times the distance between hind ocellus and eye; and 1.8 times the width of hind ocellus. First flagellomere 3.8 times as long as its basal width and 1.3 times as long as 2nd; preapical segment 1.2 times as long as wide.

Thorax and propodeum areolate; scutellum rather smooth. Radius distinct; radial cell 0.7 times as long as stigmal length. Second intercubitus postfurcal, recurrent vein weakly antefurcal to postfurcal. Petiole 6.0 times as long as apical width. Petiole and the following tergites smooth and shining.

Yellowish brown; apex of mandible brown, gaster dark brown. Antenna brownish. Legs yellowish brown; claws darker. Wings hyaline, stigma dark brown; veins pale yellow, radius more or

less darker. Ovipositor sheath dark brown.

Length: Body, 5.1 mm; antenna, 2.7 mm; fore wing, 3.2 mm; ovipositor sheath, 0.4 mm.

Male: Similar to the female.

Specimens examined: Wushe 1,150 m, Nantou, 1♂, 26–28. VIII. 1981 (L. Y. Chou & S. C. Lin), 1♀, 30. VIII.-2. IX. 1982 (L. Y. Chou & K. C. Chou), 1♀, 4. VIII. 1984 (K. S. Lin), & 4♀, 17. VIII. 1984 (K. C. Chou). Tungpu 1,200 m, Nantou, 2♀, 20–24. VI. 1983 (K. C. Chou & C. Y. Wong), & 2♀, 23–27. VII. 1984 (K. C. Chou & C. H. Yang).

This species is new to Taiwan. The specimens examined differ from Chao's original description (1974) in the intertentorial line 1.4 times tentorial-ocular line and the recurrent vein weakly antefurcal to postfurcal.

Aridelus taiwanus Chou, sp. nov.
(Figs. 7, 16, 25, 34, 43, 52, 61, 70, 79, 88)

Female: Head 2.0 times as broad as its length and 1.1–1.2 times broader than mesonotum, hairy; dorsal length of eye 1.3–1.4 times temple. Malar space 0.6 times as long as eye height Intertentorial line 1.3 times tentorial-ocular line. Face 0.5 times as high as its breadth and 0.6 times as wide as head. Clypeus and face punctulate; frons somewhat densely punctate, median frontal carina flaky; vertex and temple rather sparsely punctate. Occiput carina completely margined. Distance between hind ocelli 0.4 times the distance between hind ocellus and eye; and 1.6 times the width of hind ocellus. First flagellomere 3.9–4.2 times as long as its basal width and 1.1 times as long as 2nd; preapical segment 1.8 times as long as wide.

Thorax and propodeum areolate, scutellum rather smooth. Radius distinct; radial cell 0.7 times as long as stigmal length. Second intercubitus and recurrent vein postfurcal. Petiole 5.6 times as long as apical width. Petiole and the following tergites smooth and shining.

Black; head yellowish brown, frons and vertex dark brown medially, or stemmaticum dark brown only, apex of mandible brown, petiole yellowish brown. Antenna dark, scape and pedicel yellowish brown; or antenna yellowish brown, 13th flagellomere more or less darker, last 3 segments dark brown. Legs yellowish brown; claws darker. Tegula yellowish. Wings hyaline with only one slightly fuscous band; stigma dark brown; veins pale yellow, radius, 2nd and 3rd abscissa of cubitus, and intercubiti darker. Ovipositor sheath black.

Length: Body, 4.8–5.4 mm; antenna, 3.9–4.1 mm; fore wing, 4.2–4.5 mm; ovipositor sheath, 0.4 mm.

Male: Head yellowish brown to brownish, face with dark brown bands centrally, frons and vertex dark brown medially. Antenna dark brown, scape and pedicel yellowish brown to brownish. The fuscous band of fore wing darker than female. Recurrent vein postfurcal or interstitial.

Holotype: ♀, Tsuifeng 2,300 m, Nantou, 23. V. 1982 (L. Y. Chou). Paratypes: Sungkang 2,100 m, 1♂, IX. 1985 (K. S. Lin), Tayuling 2,560 m, Hualien, 1♀, 9–16. VI. 1980 (K. S. Lin & B. H. Chen), & 1♂, 10–15. IX. 1980 (K. S. Lin & C. H. Wang).

This species very similar to *A. sinensis* Wang (Wang, 1981), but differs from it by the body larger, petiole yellowish brown.

Etymology: Named after Taiwan.

Aridelus longius Chou, sp. nov.
(Figs. 4, 13, 22, 31, 40, 49, 58, 67, 76, 85)

Female: Head 1.8 times as broad as its length and 1.1 times broader than mesonotum, hairy;

dorsal length of eye 1.3 times temple. Malar space 0.33 times as long as eye height. Intertentorial line 2.8 times tentorial-ocular line. Face 0.6 times as high as its breadth and 0.5 times as wide as head. Clypeus, face and frons somewhat sparsely, minutely punctate, median frontal carina flaky; vertex and temple sparsely punctate. Occiput carina completely margined. Distance between hind ocelli 0.3 times the distance between hind ocellus and eye; and 1.8 times the width of hind ocellus. First flagellomere 3.5 times as long as its basal width and 1.2 times as long as 2nd; preapical segment 1.6 times as long as wide.

Thorax and propodeum areolate; scutellum rather smooth. Radius distinct; radial cell 0.6 times as long as stigmal length. Second intercubitus and recurrent vein postfurcal. Petiole 4.3 times as long as apical width. Petiole and the following tergites smooth and shining.

Dark brown; head and petiole yellowish, apex of mandible brown. Antenna brownish. Legs yellowish brown; claws darker. Tegula yellowish brown. Wings hyaline, stigma dark brown, veins pale yellow to brownish. Ovipositor sheath dark brown.

Length: Body, 3.4 mm; antenna, 2.2 mm; fore wing, 2.5 mm; ovipositor sheath, 0.2 mm.

Male: Similar to the female.

Holotype: ♀ Tungpu 1,200 m, Nantou, 23–27. VII. 1984 (K. C. Chou & C. H. Yang). Paratypes: Tungpu 1,200 m, Nantou, 1♂, 25–29. IX. 1980 (L. Y. Chou & T. Lin), & 1♀, 20–24, VI. 1983 (K. C. Chou & C. Y. Wong).

This species simiar to *A. taiwanus*, sp. nov. but differs from it by the body smaller, intertentorial line longer and malar space shorter.

Etymology: The name of the new species, *longius* (Latin), refers to its intertentorial line longer.

Aridelus reticulatus Chou, sp. nov.
(Figs. 5, 14, 23, 32, 41, 50, 59, 68, 77, 86)

Female: Head 1.8 times as broad as its length and 1.1 times broader than mesonotum, hairy; dorsal length of eye 1.5 times temple. Malar space 0.41 times as long as eye height. Intertentorial line 2.0 times tentorial-ocular line. Face 0.6 times as high as its breadth and 0.4 times as wide as head. Clypeus densely punctate; face slightly punctate-reticulate; frons and vertex reticulate-rugose, frons with two somewhat wider and lower carinae medially; temple somewhat sparsely punctate. Occiput carina completely developed. Distance between hind ocelli 0.4 times the distance between hind ocellus and eye; and 2.0 times the width of hind ocellus. First flagellomere 3.8 times as long as its basal width and 1.3 times as long as 2nd; preapical segment 1.2 times as long as wide.

Thorax and propodeum areolate. Radius distinct; radial cell 0.7 times as long as stigmal length. Second intercubitus postfurcal, recurrent vein interstitial or postfurcal. Petiole 5.8 times as long as apical width. Petiole and the following tergites smooth and shining.

Blackish; head and petiole lighter, clypeus brownish, mandible and palpi yellowish brown, apex of mandible brown. Antenna yellowish brown to light brown. Legs yellowish brown; hind femur light brown, claws darker. Tegula yellowish brown. Wings hyaline, stigma dark brown; veins pale yellow, radius, 2nd and 3rd abscissa of cubitus, and intercubiti darker. Ovipositor sheath dark brown.

Length: Body, 4.0 mm; antenna, 2.2 mm; fore wing, 2.7 mm.

Male: Similar to the female, except the petiole and hind femur yellowish brown.

Holotype: ♀, Wushe 1,150 m, Nantou, 30. VIII.-2. IX. 1982 (L. Y. Chou & K. C. Chou). Paratypes: Tungpu 1,200 m, Nantou, 2♀, 18–20. X. 1982 (K. C. Chou & S. C. Lin); & Fuli, Hualien – Tungho, Taitung, 1♂, 9–11. XI. 1982 (K. C. Chou & S. P. Huang).

This species similar to *A. rutilipes* Papp, but differs from it by the fore wing without fuscous bands and the body smaller.

Etymology: The name of the new species, *reitculatus* (Latin), refers to its frons reticulate-rugose.

Aridelus destitutus Chou, sp. nov.

(Figs. 2, 11, 20, 29, 38, 47, 56, 65, 74, 83)

Female: Head 1.9 times as broad as its length and 1.1 times broader than mesonotum, hairy; dorsal length of eye 1.6 times temple. Malar space 0.37–0.41 times as long as eye height. Intertentorial line 2.1–2.8 times tentorial-ocular line. Face 0.6 times as high as its breadth and 0.5 times as wide as head. Clypeus and face densely punctate; frons punctate-reticulate, median frontal carina somewhat wider and lower; vertex and temple somewhat sparsely punctate. Occiput carina effaced dorsally. Distance between hind ocelli 0.4 times the distance between hind ocellus and eye; and 1.6 times the width of hind ocellus. First flagellomere 3.3 times as long as its basal width and 1.3 times as long as 2nd; preapical segment 1.1 times as long as wide.

Thorax and propodeum areolate. Radius distinct; radial cell 0.5 times as long as stigmal length. Second intercubitus and recurrent vein postfurcal. Petiole 6.2 times as long as apical width. Petiole and the following tergites smooth and shining.

Black; clypeus brownish, mandible yellowish brown, apex of mandible brown, palpi yellowish brown. Antenna brownish, darker toward apex. Legs yellowish brown; hind femur dark brown, claws brown. Tegula yellowish brown. Wings hyaline, stigma dark brown; veins pale yellow; radius, 2nd and 3rd abscissa of cubitus and intercubiti darker. Ovipositor sheath dark brown.

Length: Body, 3.8 mm; antenna, 1.7 mm; fore wing, 2.4 mm.

Male: Similar to the female.

Holotype: ♀, Wushe 1,150 m, Nantou, 6. XI. 1981 (S. C. Lin & W. S. Tang). Paratypes: Chihnan temple, Taipei, 1♀, 17. X. 1961 (S. C. Chiu); Nankang, Taipei, 1♀, 20. X. 1961 (W. H. Ting); Taipei, 1♀, 1♂, 9–25. I, 1♂, 1–12. VII, 1♂, 15–24. VII, 2♀, 3♂, VIII, 1♀, 3♂, 2–7. IX, 2♀, 5♂, 15–30. IX, 3♂, 1–15. X, 3♀, 3♂, 16–31. X, 2♀, 7♂, 4–19. XI, 4♀, 3♂, 20–30. XI, 7♂, 6–15. XII, & 1♂, 20–30. XII. 1963 (K. S. Lin). Wufeng 400 m, Hsinchu, 1♀, 14–16. VII. 1982 (K. C. Chou & C. C. Pan). Chiapaotai 750 m, Taichung, 1♀, 1♂, 14–18. X. 1980 (K. S. Lin & C. H. Wang). Kukuan 730 m, Taichung, 1♀, 20–22. VI. 1978 (K. S. Lin & K. C. Chou), & 1♂, 14–17. X. 1980 (K. S. Lin & C. H. Wang). Tungpu 1,200 m, 1♀, 25–29. IX. 1980 (L. Y. Chou & T. Lin), 1♀, 5–8. X. 1981 (T. Lin & W. S. Tang), 1♀, 1♂, 18–21. X. 1982 (K. C. Chou & S. C. Lin), 1♀, 22–25. XI. 1982 (K. C. Chou & S. P. Huang), & 1♀, 20–24. VI. 1983 (K. C. Chou & C. Y. Wong). Meifeng 2,150 m, Nantou, 1♂, 20–22. VI. 1979 (K. S. Lin & B. H. Chen). Wushe 1,150 m, Nantou, 1♀, 6–11. V. 1981 (K. S. Lin & S. C. Lin), 1♀, 6. XI. 1981 (S. C. Lin & W. S. Tang), 1♀, 1♂, 7. V. 1984 (K. C. Chou & C. C. Pang), & 2♀, 17. VII. 1984 (K. C. Chou). Santimen, Pingtung, 1♂, 28. III.-1. IV. 1981 (C. C. Chen & C. C. Pang), & 1♂, 31. I.-4. II. 1983 (K. C. Chou & S. P. Huang). Fuli, Hualien – Tungho, Taitung, 2♀, 9–11. XI. 1982 (K. C. Chou & S. P. Huang).

This species similar to *A. nigricans* Chao (Chao, 1974), but differs from it in the head less transverse.

Etymology: The name of the new species, *destitutus* (Latin), refers to its occiput carina effaced dorsally.

Aridelus tsuifengensis Chou, sp. nov.
(Figs. 8, 17, 26, 35, 44, 53, 62, 71, 80, 89)

Female: Head 1.9 times as broad as its length and 1.1 times broader than mesonotum, hairy; dorsal length of eye 1.0 times temple. Malar space 0.53 times as long as eye height. Intertentorial line 1.7–1.9 times tentorial-ocular line. Face 0.5 times as high as its breadth and 0.6 times as wide as head. Clypeus densely punctate; face densely punctate, slightly rugose; frons strigate-punctate, median frontal carina rather wider and lower; vertex and temple somewhat sparsely punctate. Occiput carina effaced dorsally. Distance between hind ocelli 0.3 times the distance between hind ocellus and eye; and 1.6 times the width of hind ocellus. First flagellomere 2.6 times as long as its basal width and 1.1 times as long as 2nd; preapical segment 1.0 times as long as wide.

Thorax and propodeum areolate. Radius distinct; radial cell 0.5 times as long as stigmal length. Second intercubitus and recurrent vein postfurcal. Petiole 5.7 times as long as apical width. Petiole and the following tergites smooth and shining.

Dark brown; clypeus lighter, thorax darker, mandible yellowish brown, apex of mandible brown, palpi yellowish brown. Antenna yellowish brown to brown, darker toward apex. Legs yellowish brown; hind femur of paratype dark brown, claws dark brown. Tegula brownish. Wings hyaline, stigma dark brown, veins slightly brownish. Ovipositor sheath dark brown.

Length: Body, 3.6 mm; antenna, 2.3 mm; fore wing, 2.6 mm.

Male: Unknown.

Holotype: ♀, Tsuifeng 2,300 m, Nantou, 1–3. VIII. 1981 (T. Lin & W. S. Tang). Paratype: Tayuling 1,560 m, Hualien, 1♀, 12–15, IX. 1980 (K. S. Lin & C. H. Wang).

This species differs from other Taiwanese species of *Aridelus* in the preapical flagellomere almost as long as wide.

Etymology: Named after Tsuifeng, the type locality of this new species.

Aridelus antennatus Chou, sp. nov.
(Figs. 1, 10, 19, 28, 37, 46, 55, 64, 73, 82)

Female: Head 2.0 times as broad as its length and 1.1 times broader than mesonotum, hairy; dorsal length of eye 1.0 times temple. Malar space 0.42 times as long as eye height. Intertentorial line 2.1 times tentorial-ocular line. Face 0.6 times as high as its breadth and 0.5 times as wide as head. Clypeus somewhat sparsely punctate; face densely punctate; frons and vertex somewhat punctate-reticulate, rather smooth toward sides, median frontal carina somewhat wider and lower; temple somewhat sparsely punctate. Occiput carina effaced dorsally. Distance between hind ocelli 0.4 times the distance between hind ocellus and eye; and 1.6 times the width of hind ocellus. First flagellomere 4.4 times as long as its basal width and 1.4 times as long as 2nd; preapical segment 1.4 times as long as wide.

Thorax and propodeum areolate. Radius distinct; radial cell 0.5 times as long as stigmal length. Second intercubitus interstitial, recurrent vein postfrucal. Petiole 6.6 times as long as apical width. Petiole and the following tergites smooth and shining.

Dark brown; clypeus lighter, mandible yellowish brown, apex of mandible brown, palpi yellowish brown, petiole yellowish brown. Antenna brownish. Legs yellowish brown; claws dark brown. Tegula brownish. Wings hyaline, stigma dark brown, veins pale yellow. Ovipositor sheath dark brown.

Length: Body, 3.5 mm; antenna, 2.1 mm; fore wing, 2.4 mm.

Male: Unknown.

Holotype: ♀, Wushe 1,150 m, Nantou, 11–15. IX. 1984 (K. S. Lin).

This species similar to *A. tungpuensis*, sp. nov., but differs from it by the relative length of eye and temple in dorsal view and the shape of flagellum.

Etymology: The name of the new species, *antennatus* (Latin), refers to its shape of antenna.

Aridelus tungpuensis Chou, sp. nov.
(Figs. 9, 18, 27, 36, 45, 54, 63, 72, 81, 90)

Female: Head 2.0 times as broad as its length and 1.1 times broader than mesonotum, hairy; dorsal length of eye 1.6 times temple. Malar space 0.46 times as long as eye height. Intertentorial line 1.7 times tentorial-ocular line. Face 0.5 times as high as its breadth and 0.6 times as wide as head. Clypeus and face densely punctate; frons strigate-punctate, median frontal carina somewhat wider and lower; vertex and temple somewhat sparsely punctate. Occiput carina effaced dorsally. Distance between hind ocelli 0.4 times the distance between hind ocellus and eye; and 1.6 times the width of hind ocellus. First flagellomere 3.7 times as long as its basal width and 1.2 times as long as 2nd; preapical segment 1.2 times as long as wide.

Thorax and propodeum areolate. Radius distinct; radial cell 0.5 times as long as stigmal length. Second intercubitus interstitial, recurrent vein postfurcal. Petiole 5.9 times as long as apical width. Petiole and the following tergites smooth and shining.

Black, mandible yellowish brown, apex of mandible brown, palpi yellowish brown. Antenna brownish, darker toward apex. Legs yellowish brown; hind femur dark brown, claws brown. Tegula yellowish brown. Wings hyaline, stigma dark brown; veins pale yellow; radius, 2nd and 3rd abscissa of cubitus and intercubiti darker. Ovipositor sheath dark brown.

Length: Body, 3.7 mm; antenna, 2.2 mm; fore wing, 2.8 mm.

Male: Similar to the female.

Holotype: ♀, 20–24. IV. 1982 (T. Lin & K. C. Chou). Paratypes: Tungpu 1,200 m, Nantou, 2♀, 5♂, 28. IV.-2. V. 1981 (T. Lin & C. J. Lee), 1♀, 18–23. XI. 1981 (T. Lin & W. S. Tang), 4♂, 20–24. IV. 1982 (T. Lin & K. C. Chou), 2♂, 19–23. VII. 1982 (L. Y. Chou & T. Lin), 1♂, 20–24. VI. 1983 (K. C. Chou & C. Y. Wong), 3♂, 16–20. IV. 1984 (K. C. Chou & C. H. Yang), 1♂, 23–27. VII. 1984 (K. C. Chou & C. H. Yang). Wushe 1,150 m, Nantou, 2♀, 6♂, 7. V. 1984 (K. C. Chou & C. C. Pan).

This species very similar to *A. destitutus* sp. nov., but differs from it in the smaller relative length of intertentorial line and tentorial-ocular line, and the first intercubitus interstitial.

Etymology: Name after Tungpu, the type locality of this new species.

ACKNOWLEDGEMENTS

I wish to express my sincere thanks to the National Science Council for support in part of this study, and to Ms. Shui-chen Chiu, senior entomologist of the Department of Applied Zoology, TARI, for her encouragement and revising the manuscript.

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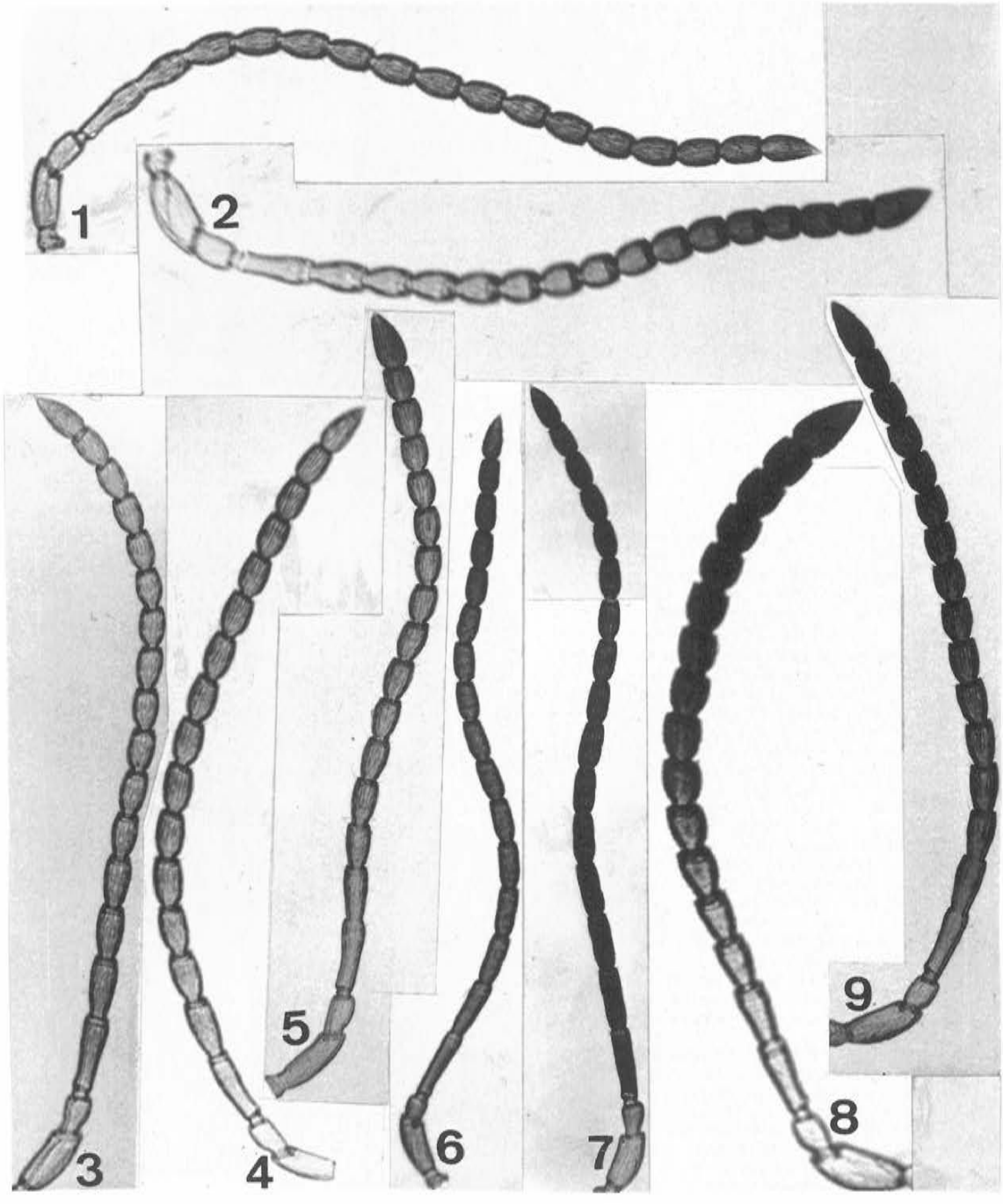
臺灣產椿繭蜂屬之分類

(膜翅目：小繭蜂科：優繭蜂亞科)

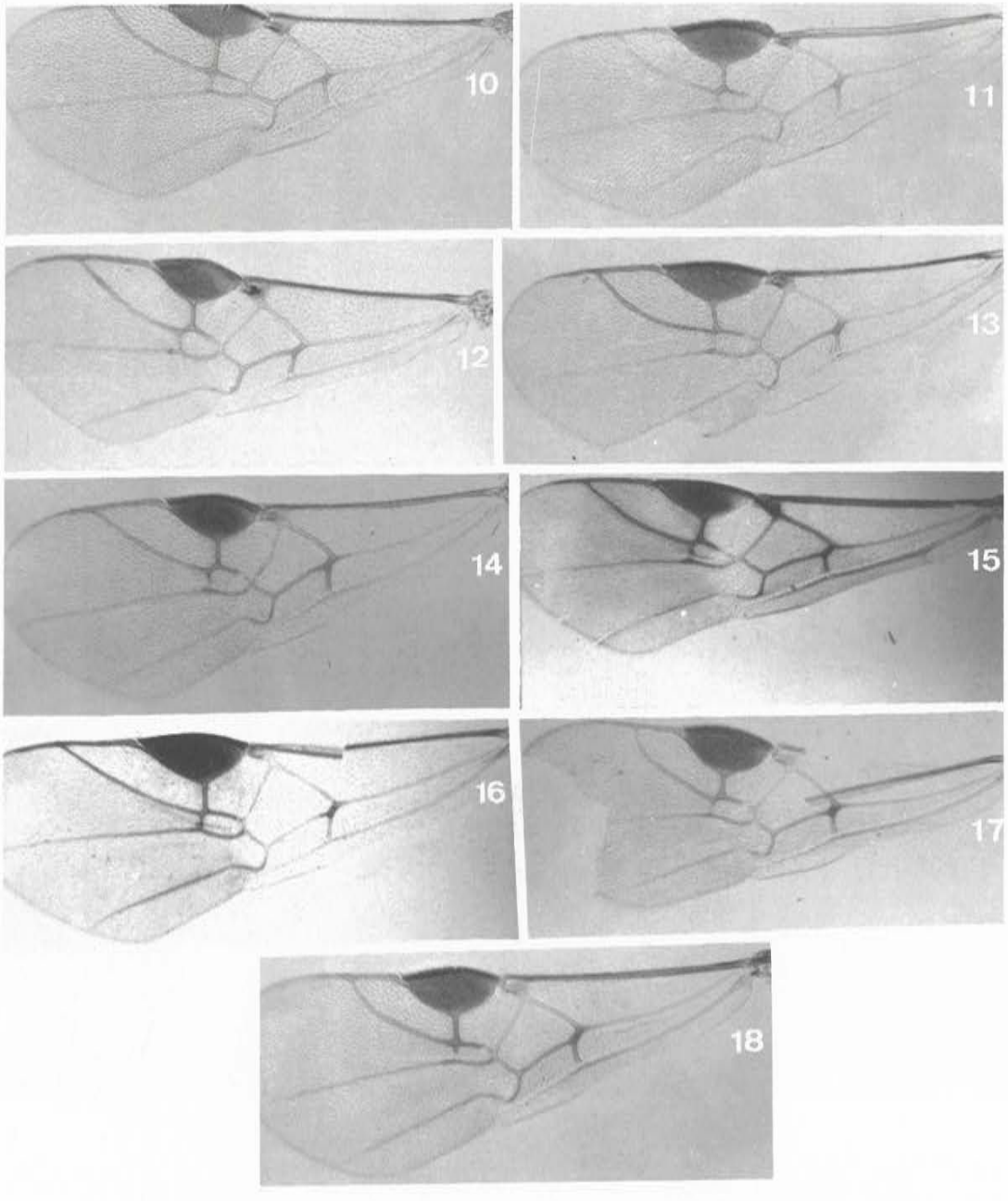
周 樑 鎰

中文摘要

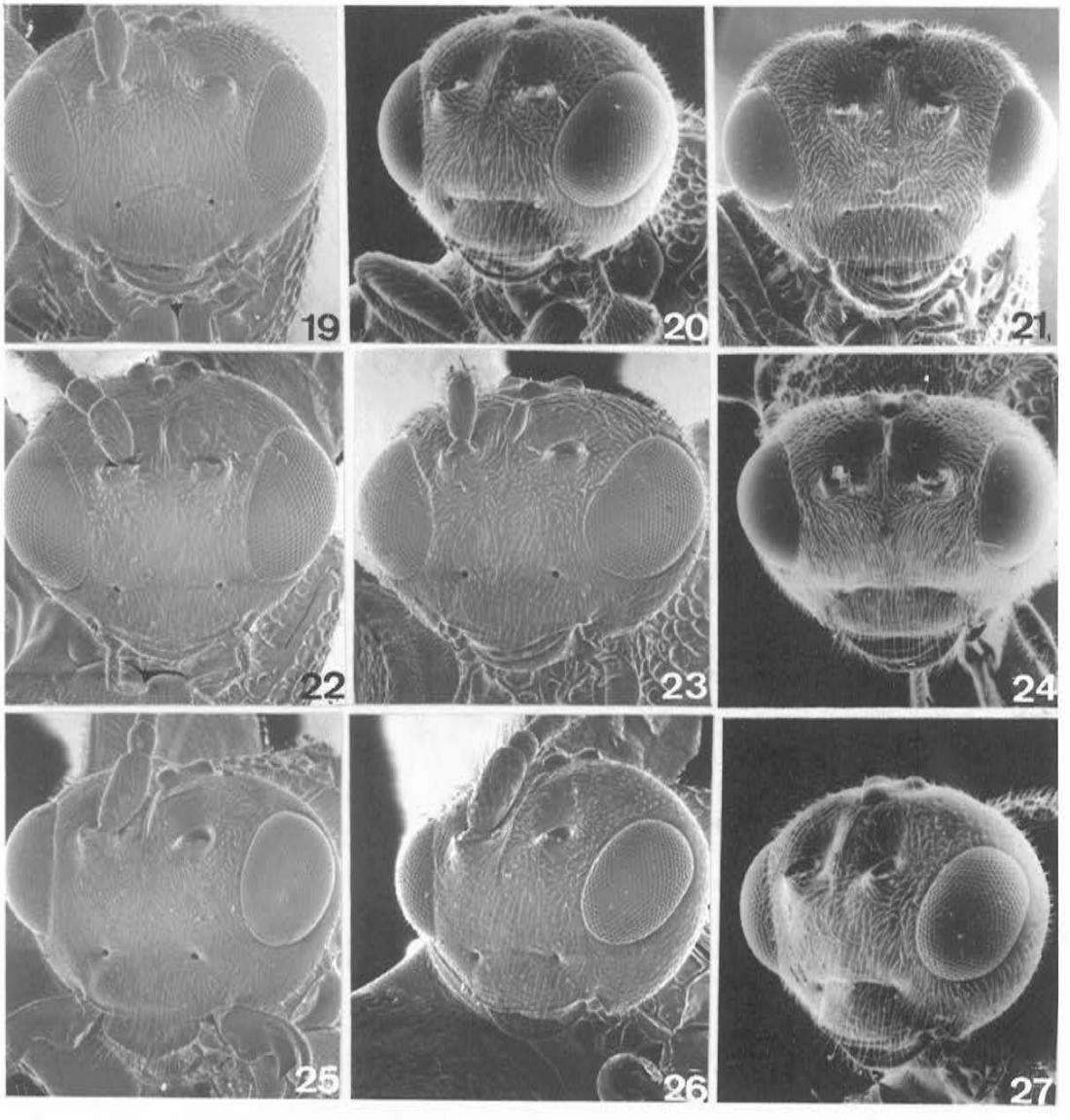
椿繭蜂屬(*Aridelus*)隸膜翅目、小繭蜂科、優繭蜂亞科，乃椿象科若蟲與成蟲期之寄生蜂，全世界已知之種類約30餘種。本文描述臺灣產之9種椿繭蜂，其中 *Aridelus antennatus, A. destitutus, A. longius, A. reticulatus, A. taiwanus, A. tsuifengensis*及*A. tungpuensis*等7種爲新種。*Aridelus flavicans* Chao爲臺灣新記錄。文中並附分種檢索表及特徵圖。此外並附臺灣優繭蜂亞科屬之檢索表，其中10屬爲臺灣新記錄。



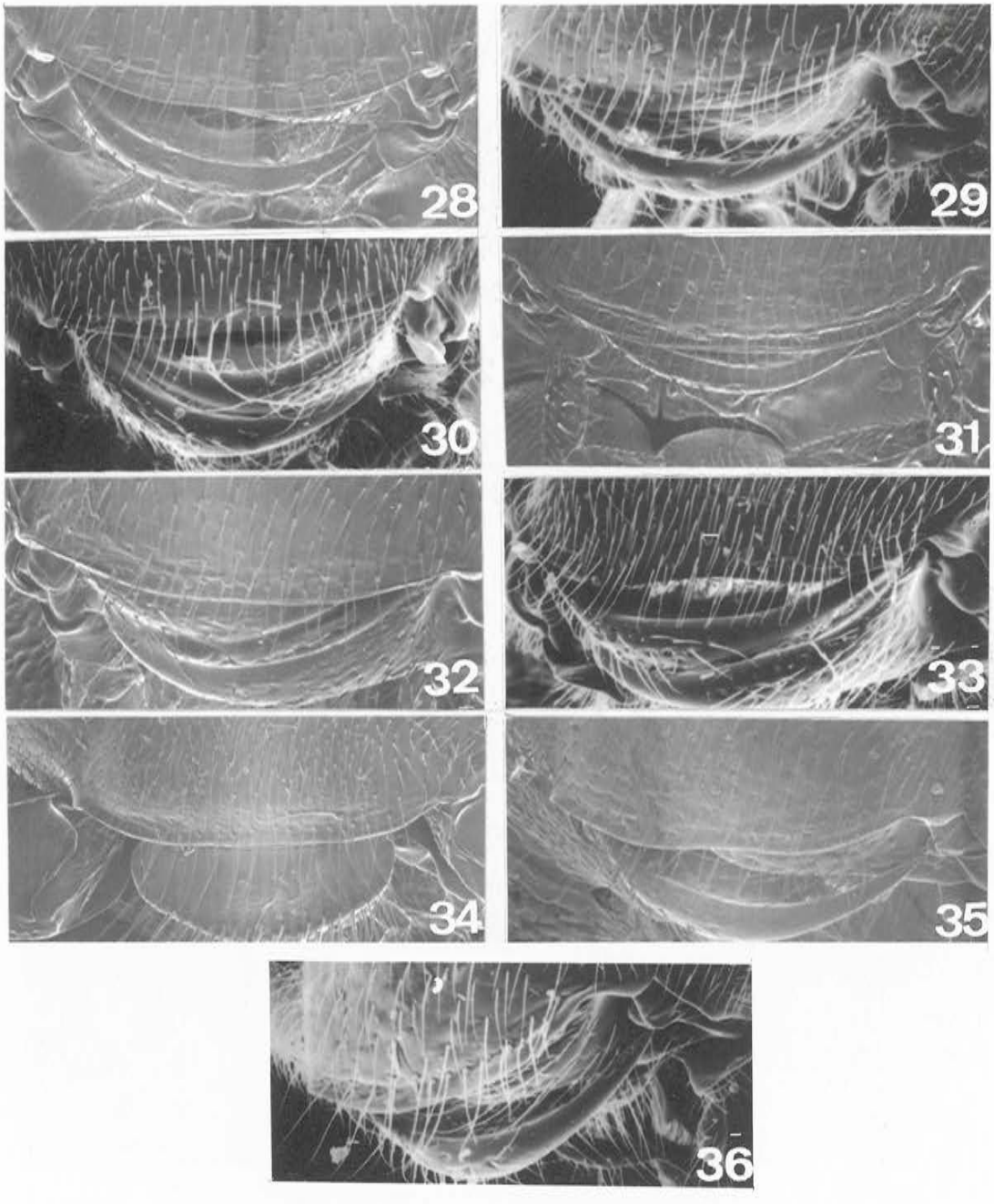
Figs. 1–9, Antennae of *Aridelus* spp. (female): 1, *antennatus* sp. nov.; 2, *destitutus* sp. nov.; 3, *flavicans* Chao; 4, *longius* sp. nov.; 5, *reticulatus* sp. nov.; 6, *rutilipes* Papp; 7, *taiwanus* sp. nov.; 8, *tsuifengensis* sp. nov.; 9, *tungpuensis* sp. nov.



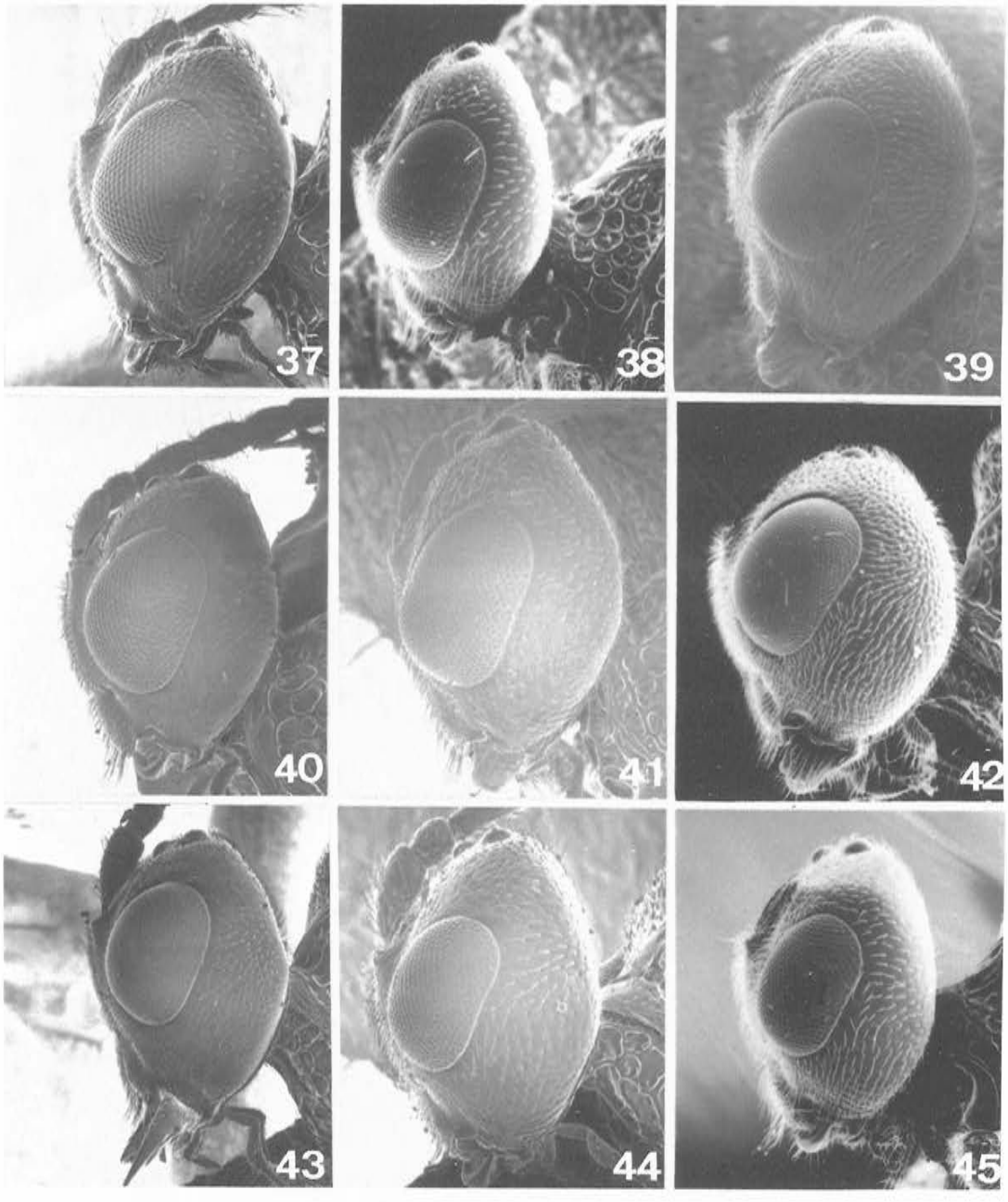
Figs. 10–18, Fore wings of *Aridelus* spp. (female): 10, *antennatus* sp. nov.; 11, *destitutus* sp. nov.; 12, *flavicans* Chao; 13, *longius* sp. nov.; 14, *reticulatus* sp. nov.; 15, *rutilipes* Papp; 16, *taiwanus* sp. nov.; 17, *tsuifengensis* sp. nov.; 18, *tungpuensis* sp. nov.



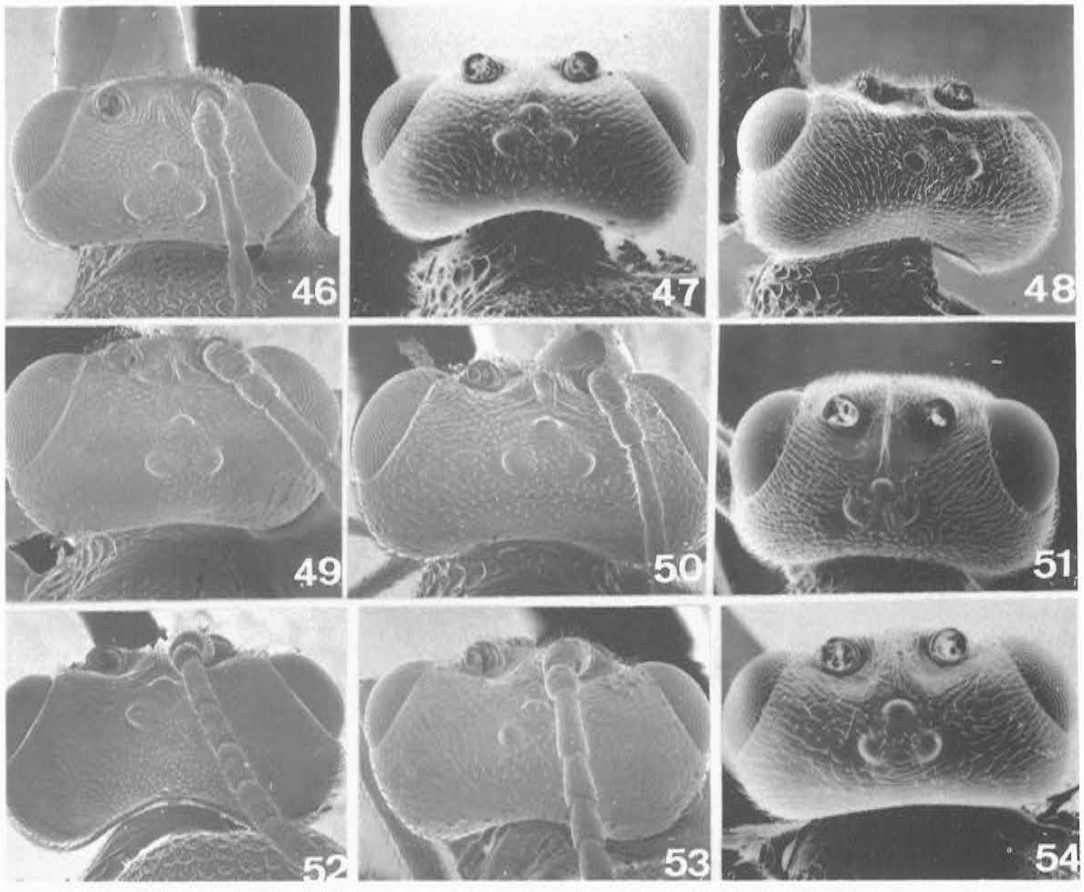
Figs. 19–27, Frontal view of heads of *Aridelus* spp. (female): 19, *antennatus* sp. nov.; 20, *destitutus* sp. nov.; 21, *flavicans* Chao; 22, *longius* sp. nov.; 23, *reticulatus* sp. nov.; 24, *rutilipes* Papp; 25, *taiwanus* sp. nov.; 26, *tsuifengensis* sp. nov.; 27, *tungpuensis* sp. nov.



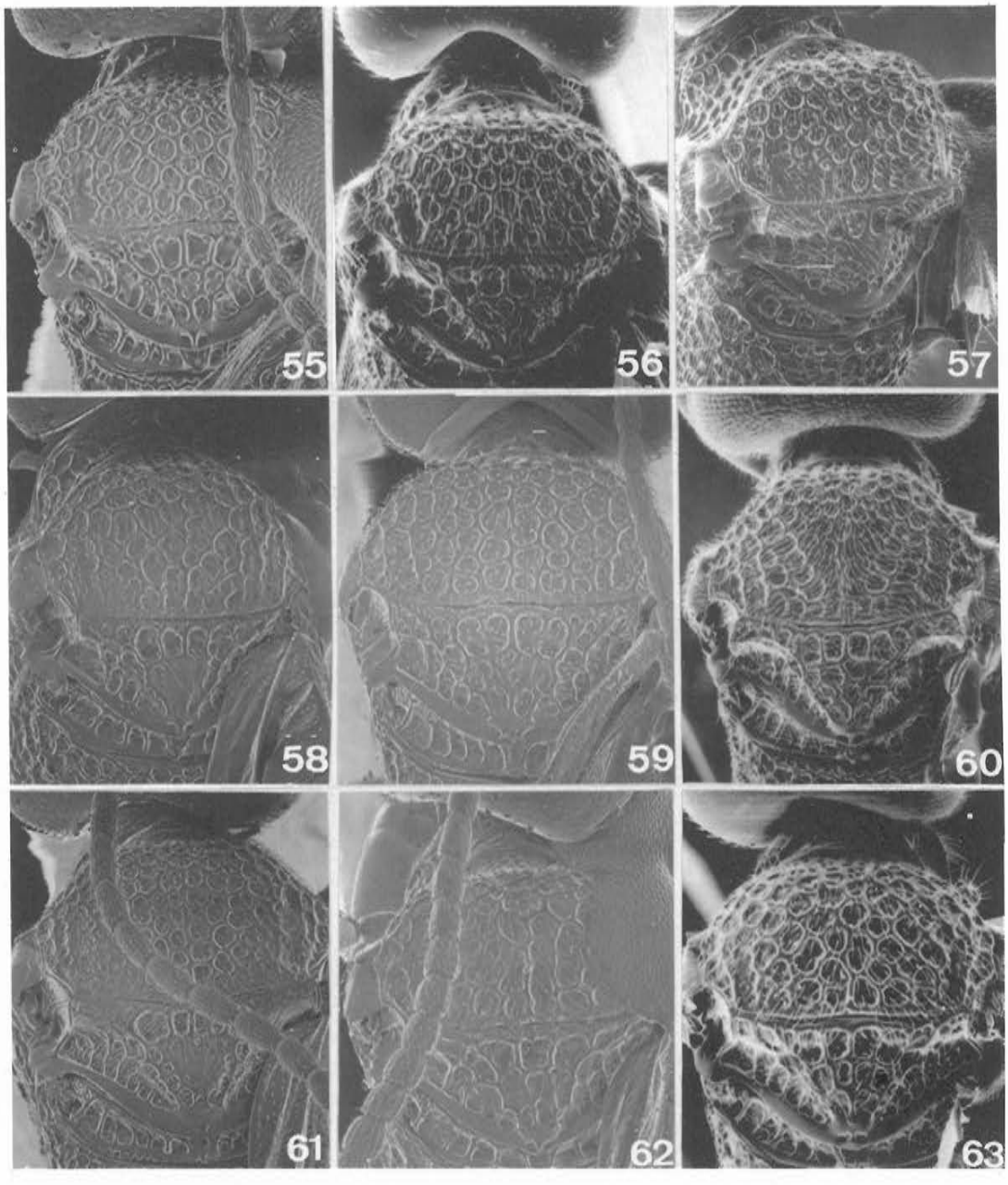
Figs. 28–36, Apex of clypeus of *Aridelus* spp. (female): 28, *antennatus* sp. nov.; 29, *destitutus* sp. nov.; 30, *flavicans* Chao; 31, *longius* sp. nov.; 32, *reticulatus* sp. nov.; 33, *rutilipes* Papp; 34, *taiwanus* sp. nov.; 35, *tsuifengensis* sp. nov.; 36, *tungpuensis* sp. nov.



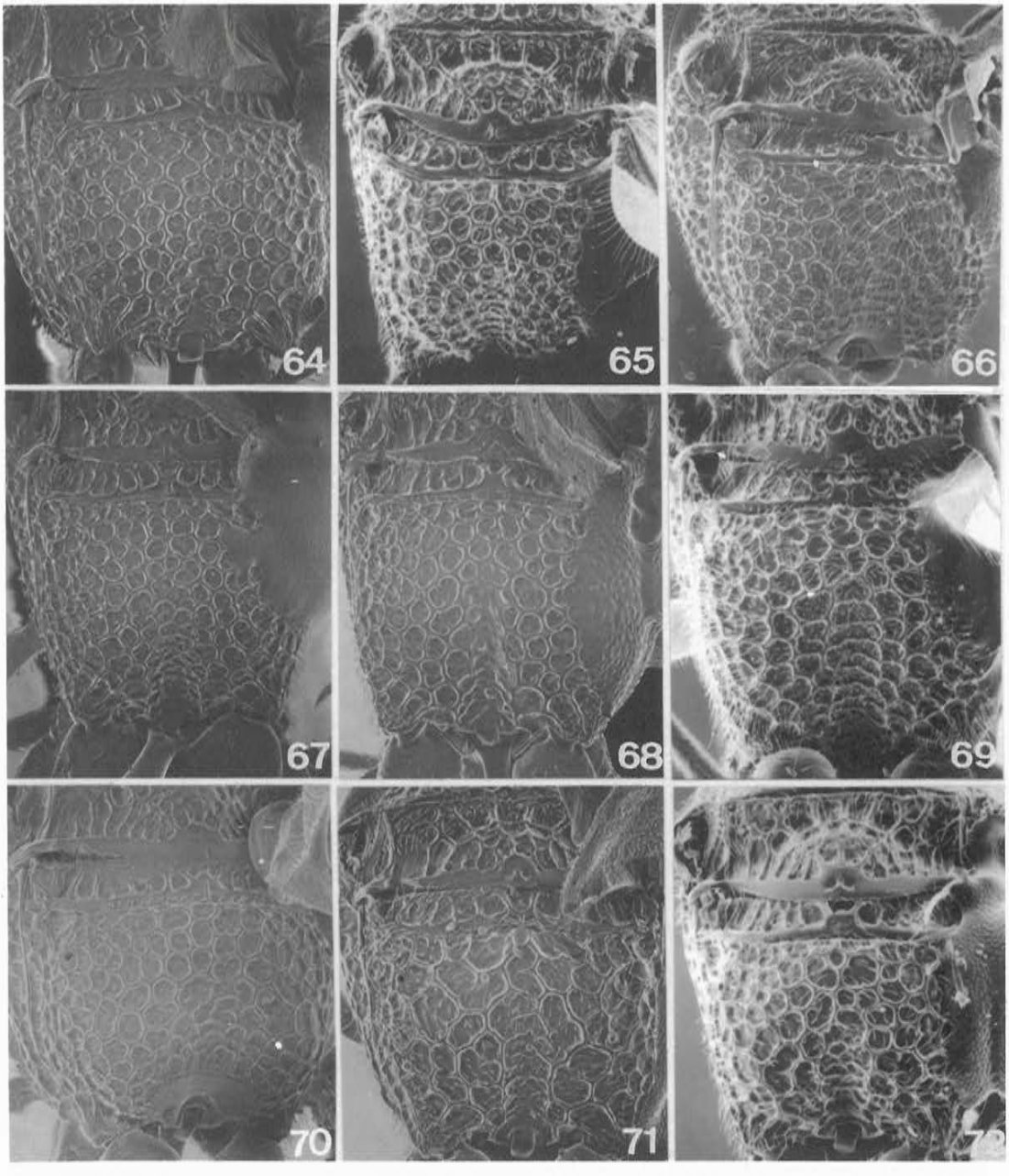
Figs. 37–45, Lateral view of heads of *Aridelus* spp. (female): 37, *antennatus* sp. nov.; 38, *destitutus* sp. nov.; 39, *flavicans* Chao; 40, *longius* sp. nov.; 41, *reticulatus* sp. nov.; 42, *rutilipes* Papp; 43, *taiwanus* sp. nov.; 44, *tsuifengensis* sp. nov.; 45, *tungpuensis* sp. nov.



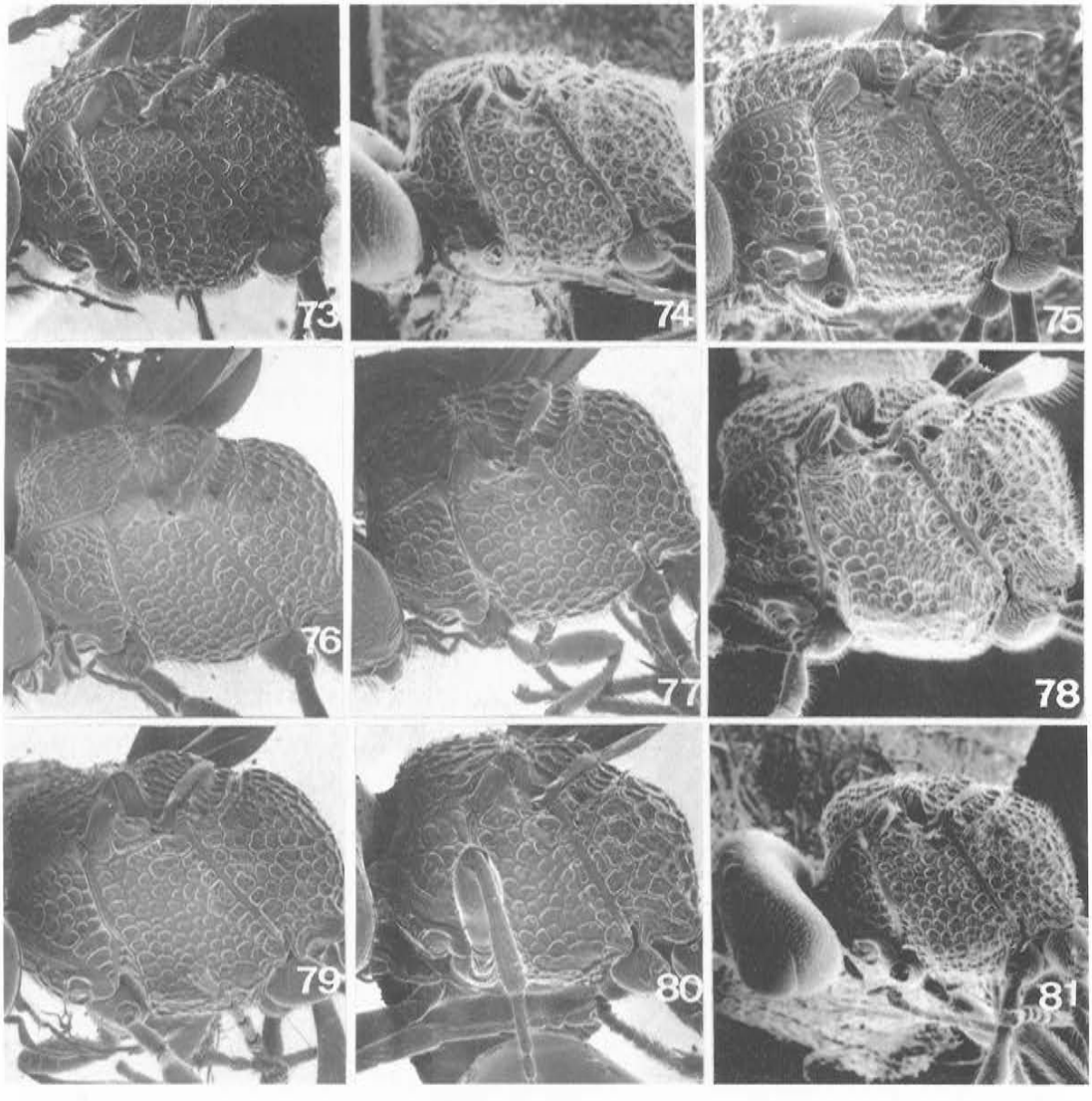
Figs. 46–54, Dorsal view of heads of *Aridelus* spp. (female): 46, *antennatus* sp. nov.; 47, *destitutus* sp. nov.; 48, *flavicans* Chao; 49, *longius* sp. nov.; 50, *reticulatus* sp. nov.; 51, *rutilipes* Papp; 52, *taiwanus* sp. nov.; 53, *tsuifengensis* sp. nov.; 54, *tungpuensis* sp. nov.



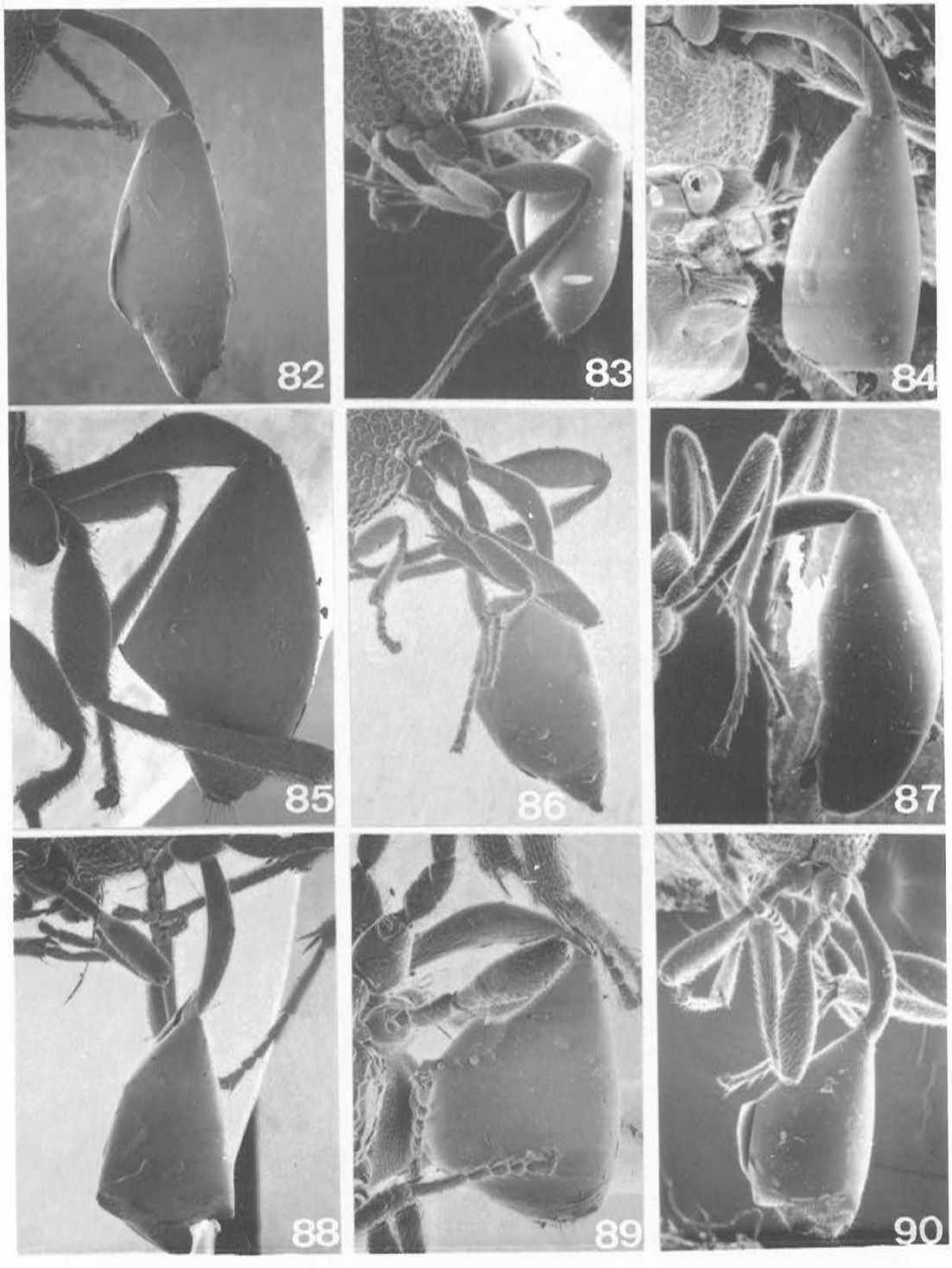
Figs. 55–63, Dorsal view of mesonotums of *Aridelus* spp. (female): 55, *antennatus* sp. nov.; 56, *destitutus* sp. nov.; 57, *flavicans* Chao; 58, *longius* sp. nov.; 59, *reticulatus* sp. nov.; 60, *rutilipes* Papp; 61, *taiwanus* sp. nov.; 62, *tsuifengensis* sp. nov.; 63, *tungpuensis* sp. nov.



Figs. 64–72, Dorsal view of propodeums of *Aridelus* spp. (female): 64, *antennatus* sp. nov.; 65, *destitutus* sp. nov.; 66, *flavicans* Chao; 67, *longius* sp. nov.; 68, *reticulatus* sp. nov.; 69, *rutilipes* Papp; 70, *taiwanus* sp. n.; 71, *tsuifengensis* sp. nov.; 72, *tungpuensis* sp. nov.



Figs. 73–81, Lateral view of thoraces of *Aridelus* spp. (female): 73, *antennatus* sp. nov.; 74, *destitutus* sp. nov.; 75, *flavicans* Chao; 76, *longius* sp. nov.; 77, *reticulatus* sp. nov.; 78, *rutilipes* Papp; 79, *taiwanus* sp. nov.; 80, *tsuifengensis* sp. nov.; 81, *tungpuensis* sp. nov.



Figs. 82–90, Lateral view of abdomens of *Aridelus* spp. (female): 82, *antennatus* sp. nov.; 83, *destitutus* sp. nov.; 84, *flavicans* Chao; 85, *longius* sp. nov.; 86, *reticulatus* sp. nov.; 87, *rutilipes* Papp; 88, *taiwanus* sp. nov.; 89, *tsuifengensis* sp. nov.; 90, *tungpuensis* sp. nov.

Taiwan Agric. Res. Inst., Spec. publ. No. 22: 41–50 23 May 1987

ON THE GENUS *ROPRONIA* PROVANCHER, 1886 (HYMENOPTERA: ROPRONIIDAE) OF TAIWAN AND FUKIEN, CHINA[1]

by
K. S. Lin[2]

Abstract: Four *Ropronia* species, including two new ones *insularis* and *maai* are hereby recorded from Taiwan and Fukien, Southeastern China. In addition to the records, descriptions and illustrations of the those four, a checklist of and a synoptic key to the 12 species of the entire genus are provided in this paper.

INTRODUCTION

Ropronia Provancher, 1886 is the only genus of the very small family Roproniidae (superfamily Serphoidea). In venational characters, in particular, it is closely related to the genera *Helorus* Latreille, 1802 (family Heloridae) and *Vanhornia* Crawford, 1909 (family Serphidae). Some earlier authors assigned *Ropronia* to Heloridae but the characters of the head and gaster are so distinctive that *Ropronia* seems to be justified to stand as the type genus of an independent family.

The first species of the genus was described 100 years ago. Since then 8 species (including the 2 new ones hereby described) are known from China, Japan and Sakhalin, 3 from Canada and the USA, and 1 from Burma. It is therefore apparent that *Ropronia* is largely found in the Holarctic Region, and its occurrence in the Oriental Region (Burma, Taiwan) is mostly confined to higher altitudes. It is also interesting to note that no *Ropronia* has ever been discovered in the western Palearctic Region.

This paper is solely based on the collection in the Taiwan Agricultural Research Insittute. The Taiwanese specimens recorded herewith were collected by sweepings and by the Malaise traps by: K. C. Chou (KCC), L. Y. Chou (LYC), S. P. Huang (SPH), C. N. Lin (CNL), K. S. Lin (KSL), S. C. Lin (SCL), T. Lin (TL), C. C. Pan (CCP), W. S. Tang (WST), C. H. Wang (CHW); from the following localities in central Taiwan: TAICHUNG Hsien, Anmashan 2,275 m, Chiapaotai 750 m. NANTOU Hsien, Tsuifeng 2,300 m, Meifeng 2,150 m, Sungkang 2,100 m, Tungpu 1,200 m.

Genus **ROPRONIA** Provancher

Ropronia Provancher, 1886:154. Type-species: *Ropronia pediculata* Provancher, by monotypic.

[1] Contribution No. 1345 from Taiwan Agricultural Research Institute. Partial result of the program "A Survey on Insect Fauna of Taiwan", supported in part at TARI by a grants-in-aid during the period between 1980–1986 from the National Science Council of Taiwan, Republic of China.

[2] Retired Entomologist of TARI. c/o Department of Applied Zoology, TARI, Wufeng, Taichung, Taiwan 41301, R. O. C.

Roptronia Ashmead, 1898:132. Error.

A check list of the genus *Ropronia* Provancher of the World

brevicornis Townes, 1948:88, ♀ ♂. China (Taiwan, Fukien, Shansi), Japan.
californica Ashmead, 1898:133, ♀ ♂. U. S. A. (California, Oregon).
garmani Ashmead, 1898:132, ♀ ♂. U. S. A. (New Hampshire to Georgia, west to Iowa).
insularis sp. nov. ♀ ♂. China (Taiwan).
ishiharai Yasumatsu, 1956:118, ♀ ♂. Japan.
maai sp. nov. ♀. China (Fukien).
malaisei Hedqvist, 1959:137, ♂. Burma.
pediculata Provancher, 1886:154, ♀. Canada (Ontario), U. S. A. (New York).
szechuanensis Chao, 1962:378, ♀ ♂. China (Taiwan, Szechuan).
townesi Yasumatsu, 1956:122, ♀. Japan.
watanabei Yasumatsu, 1958:112, ♂. Sakhalin.
zhejiangensis He, 1983:279, ♂. China (Chekiang = Zhejiang).

Key to known species of *Ropronia* Provancher

(Modified from Hedqvist, 1959 and Chao, 1962)

1. Metanotum elevated as an acute pyramid; head and thorax mostly or entirely ferruginous. ♀ ♂ ..... ***californica*** Ashmead, 1898
– Metanotum convex, not conspicuously elevated; head and thorax brown to black, sometimes marked with white. 2
2. Nervulus antefurcal; frons and top of head coarsely rugose-punctate. ♀ ..... ***pediculata*** Provancher, 1886
– Nervulus postfurcal; frons and top of head not rugose-punctate. 3
3. Fore wing with a large fuscous spot below stigma. 4
– Fore wing without such spot. 5
4. Side scrobe of pronotum almost smooth and shining; anterior margin of clypeus incised medially; vertex, mesoscutum posteriorly, scutellum and metanotum posteriorly almost smooth and shining, with sparse, fine punctures; fuscous spot of fore wing reaching to radius; gaster except petiole ferruginous. ♀ ♂ ..... ***szechuanensis*** Chao, 1962
– Side scrobe of pronotum punctate-rugose except a small lower disk smooth; anterior margin of clypeus broadly rounded; vertex, mesoscutum posteriorly, scutellum and metanotum posteriorly with rather coarse punctures; fuscous spot of fore wing larger, reaching to radius and medius; gaster black. ♀ ♂ ..... ***brevicornis*** Townes, 1948
5. Head much wider than high in front view. 6
– Head subcircular in outline viewed from front. 7
6. Vertex with rather close, sharp medium-sized punctures; mesoscutum with medium-sized punctures separated by about their diameter ♀ ♂. ..... ***garmani*** Ashmead, 1898
– Vertex with coarse, weak punctures; mesoscutum with medium-sized punctures, the diameter of puncture greater than interdistance between two neighboring punctures. ♂ ..... ***watanabei*** Yasumatsu, 1958
7. Second abscissa of cubitus (2–SR+M) of fore wing longer than 1st transverse cubitus (2–SR); vertex and mesoscutum finely punctate; scutellum smooth. ♂ .... ***malaisei*** Hedqvist, 1959

– Second abscissa of cubitus (2–SR+M) of fore wing shorter than 1st transverse cubitus (2–SR). 8

8. Temple about as long as eye in lateral view of head; dorsal area of gastral petiole densely distinctly punctate; 2nd discoidal cell of fore wing narrow, distinctly more than twice as long as wide. ♀. ..... ***townesi*** Yasumatsu, 1956

– Temple either shorter or longer than eye; dorsal area of gastral petiole either with some irregular sculptures or smooth and shining; 2nd discoidal cell of fore wing variable in shape. 9

9. Area between postocelli flattened or with a short longitudinal furrow. 10

– Area between postocelli with a short longitudinal ridge. 11

10. Vertex strongly elevated; area between postocelli without a short longitudinal furrow. ♂. ..... ***zhejiangensis*** He, 1983

– Vertex very weakly convex; area between postocelli with a short longitudinal furrow. ♀. ..... ***maai*** sp. nov.

11. Temple distinctly longer than eye in lateral view of head; dorsal area of gastral petiole with some irregular sculptures; gaster black. ♀ ♂. ..... ***ishiharai*** Yasumatsu, 1956

– Temple distinctly shorter than eye in lateral view of head; dorsal area of gastral petiole smooth in female but sculptured in male; gaster ferruginous. ♀ ♂. ..... ***insularis*** sp. nov.

Ropronia brevicornis Townes
(Figs. 1–3, 7–8)

Ropronis brevicornis Townes, 1948:88–89, fig., ♂ ♀. Holotype in U.S. Nat. Mus., reared from *Periclista* sp. in Fukien: Foochow.

Ropronia brevicornis Chao, 1957:73–76, ♂ ♀, redes., figs.

Host: *Periclista* sp. (Tenthredinidae).

Distribution: China (Taiwan, Fukien, Shansi), Japan.

Specimen examined: ♂, Meifeng, IV. 1984, Malaise trap (KSL & KCC).

Ropronia szechuanensis Chao
(Figs. 4–6, 9–11)

Ropronia szechuanensis Chao, 1962:378–381, figs., ♂ ♀. Szechuan: Chengtu, Mt. Omei. Holotype in Zool. Inst. Acad. Sinica.

Distribution: China (Taiwan, Szechuan).

Specimen examined: ♀, Chiapaotai, 14–18. X. 1980 (KSL & CHW); ♂, Tungpu, 28–29. VI. 1978 (LYC); ♂, 5–6. X. 1981; ♀, 18–23. XI. 1981 (TL & WST); ♀, 2♂♂, X. 1985; 5♂♂, XI. 1985; ♀, XII. 1985, Malaise trap (KSL).

Ropronia maai Lin, sp. nov.
(Figs. 12–17, 24)

Female: Fore wing 6.6 mm long. Head in dorsal view wider than thorax (39:31), and parallel-sided behind eyes; in front view lower than wide (32:37). Surface with rather dense setigerous punctures except at median area of vertex; temple and gena posteriorly with distinctly sparser punctures; vertex very weakly raised, with a short longitudinal groove behind anterior ocellus; ocelli ar-

ranged in a low triangle, LOL:POL:OOL about 3:5.5:10.5; occiput, temple and upper area of frons with some weakly, transversely wrinkled; with fine longitudinal rugae before anterior ocellus; frons weakly depressed laterally. With a keel between antennal toruli and reaching to lower face, dorsal margin of keel undulate in profile. Face with dense punctures. Clypeus about 3.4 as wide as long, with punctures somewhat coarser than those on face, lateral areas wrinkled. Malar space short, about 0.3 as high as eye. Eye relatively small, about 1.5 as high as wide; gena and temple convex, the latter slightly longer than eye. Antennal flagellomeres gradually attenuate and bent, except terminal segment which is cylindrical; relative lengths and widths of segments 8:4; 4:3; 10:3; 8.5:3; 8.5:2.7; 7.5:2.5; 7:2.4; 6.9:2.4; 6:2.3; 6:2.3; 5.5:2; 5.4:1.9; 5:1.8; 7:1.7.

Thorax covered with dense setigerous punctures, pronotum densely punctate and wrinkled, side of pronotum obliquely wrinkled, lower portion with a small polished area; epomia distinct. Mesoscutum shorter than wide, posterolateral margin raised, submarginal groove narrow; notauli distinctly foveate; anterior parallel lines and lateral lines distinct; punctures on anterior and lateral portions rather fine and dense, those on inner side of lateral line slightly sparser. Prescutellar groove deep, with 5 or 6 longitudinal ridges. Scutellum covered with coarse punctures similar to those on posterior portion of median lobe of mesoscutum; lateral depression with transverse rugae. Mesopleuron with punctate-rugulose anteriorly, densely punctate on lower portion, posterior disk convex, longitudinal depression smooth, posterior groove foveate. Metanotum weakly convex, largely punctate-reticulate, more strongly so at anterolateral areas. Metapleuron rugose-reticulate except the disk area which is convex, almost smooth, with a few fine punctures. Fore wing as fig. Legs finely punctate and haired. Propodeum rugulose-areolate, with a weak median carina anteriorly, submedian carinae distinct. Gastral petiole about 3.7 as long as deep, punctate ventrally and laterally; smooth dorsally, anterior portion with sculptures laterally and weak ridge; gaster smooth with short hairs; venter behind petiole with punctures, more densely so near base.

Body brownish black, clothed with greyish white hairs; brownish yellow on lower half of head, mandible (apex brown), maxillary palpus, posterior margin and posterolateral portion of pronotum, fore leg, mid coxa, bases of all trochanters, both ends of mid and hind femora, tibiae and tarsi, and base half of hind tibia; brown on tegula, mid and hind legs; antennae brownish dorsally, pale fulvous venterally; wings hyaline, apical portion of fore wing very weakly infuscate, veins brownish.

Male: Unknown.

Distribution: SE China: Fukien.

Specimen examined: Hologype ♀, Fukien: Shaowu Hsien 1,200–1,500 m, 10. VI. 1942 (TCMaa), left antennal flagellomeres mutilated.

As shown by couplet 10 of the key, this new species is separable from *zhejiangensis* He by having the vertex not strongly elevated and having the area between postocelli with a short longitudinal furrow. The name is in honor of Prof. T. C. Maa.

Ropronia insularis Lin, sp. nov.

(Figs. 18–23)

Female: Fore wing 5.2–5.6 mm long. Head in dorsal view wider than thorax (27:23), weakly convergent behind eye; in front view lower than wide (23:27); surface with dense setigerous punctures which are sparser on vertex, occiput, temple and gena. Vertex weakly convex, with a weak short, longitudinal ridge behind anterior ocellus; ocelli arranged in a very low triangle, LOL:POL:OOL about as 3:7:11.5. Frons flattened, coarsely punctate, rugulose anterolaterally and before

anterior ocellus; antennal scrobes very strongly elevated laterally. Between antennal toruli with a keel, its posterior half very strongly elevated, triangulate in profile; in posterodorsal view, the keel diverging 2 ridges and with very deep median longitudinal furrow; anterior half of keel weakly raised and reaching past midway of face. Face rather densely punctate. Clypeus about 3.8 as wide as long, with rather longitudinal punctures medially and obliquely punctate laterally, anterior margin smooth, evenly rounded, sometimes very broadly concavely curved. Malar space short, about 0.2 as high as eye; eye about 13:10, distinctly protruding, broader than temple; temple convex, rounded posteriorly. Antennal flagellum gradually attenuate toward apex and all except terminal segment weakly bent; relative lengths and widths of segments as 6:3; 2.5:2.5; 7.5:2.4; 7.5:2.2; 7:2; 7:2.1; 6:2.1; 6:2.1; 5.7:2; 5.5:1.8; 4.7:1.8; 4.5:1.7; 4.5:1.7; 6:1.7.

Thorax covered with dense setigerous punctures. Side of pronotum with punctures distinctly sparser than those on lower disk. Epomia distinct. Notauli foveolate, posterior fovea rather coarse and deep; anterior parallel lines not distinct, lateral lines weak; punctures coarse but those on anterior region slightly smaller and denser; posterolateral margin weakly raised, submarginal groove foveolate. Prescutellar groove deep, with 4–5 longitudinal ridges. Mesopleuron with irregular rugae anteriorly, sometimes with 1 or 2 curved submarginal ridges; posterior disk smooth and shining; longitudinal depression smooth, anterior half foveolate and with a transverse carina; lower portion with rather densely punctate and with some transverse wrinkles; posterior groove foveate. Metanotum with large foveae anteriorly, with a median and a pair of weak submedian ridges; posterior portion slightly convex, irregularly rugulose. Metapleuron with irregular rugae and weak carinae. Fore wing as in fig. Propodeum with areolate-rugose, 4 large foveae anteriorly, sometimes with median carina anteriorly. Gastral petiole about 3.8 as long as deep when viewed laterally, hairs on venter denser than those on lateral surface; dorsal surface smooth medially, punctate-reticulate anteriorly, lateral ridge past midway or percurrent, with uniseriate small punctures posterolaterally; lateral surface with irregularly rugulose posteriorly. Gaster smooth and with short sparse hairs.

Black; ferruginous on mandibular apex and gaster; pale yellow on lower half of head, venter of scape, base of mandible, palpi (terminal segments slightly darker), lateral hind margin and lower portion of pronotum, fore and mid coxae and trochanters, venter of femora and basal half of hind tibia; brownish on tegula, base of mid coxa, dorsum of fore and mid femora and terminal tarsomeres. Antenna brown, its venter fulvous; hind leg brown. Wings hyaline, apex of fore wing very weakly infuscate, veins brown.

Male: Fore wing 5.4–6.2 mm long. Essentially similar to female, but head usually black; often with yellowish markings on lateral areas of face and clypeus, sometimes even on entire lower half of head; but anterior margin of clypeus always blacke, palpi and legs usually dark brown, dorsum of fore and mid coxae dark brown to black. Gastral petiole with more or less longitudinal sculptures on dorsal surface.

Distribution: Taiwan.

Specimen examined: Holotype ♀, Taiwan: Nantou Hsien, Tsuifeng 2,300 m, IX. 1985, Malaise trap (KSL).

Paratypes: Anmashan, ♂, 6–9. VII. 1979 (LYC). Tsuifeng, 2♂♂, 16. VII. 1982 (SCL & CNL); ♂, 15–16. VIII. 1984 (KCC); ♂, VI. 1984; 3♀♀, 40♂♂, VII. 1984; ♀, 27♂♂, VIII. 1984; 3♂♂, IX. 1984; 8♀♀, 20♂♂, X. 1984, Malaise trap (KSL & KCC). Meifeng, ♂, 2–12. X. 1979, Malaise trap; ♂, 19–21. IV. 1983 (KCC & SPH); ♀, V. 1984; 4♀♀, 5♂♂, VI. 1984; 5♀♀, 5♂♂, VII. 1984; 2♀♀, 7♂♂, VIII. 1984; ♀, IX. 1984; 4♀♀, 4♂♂, X. 1984, Malaise trap (KSL & KCC). Sungkang, 2♀♀, X. 1984, Malaise trap (KSL & KCC); 3♀♀, 2♂♂, X. 1985, Malaise trap (KSL). Alishan, ♂, 17–20. VIII. 1982 (KCC & CCP).

This species appears to be closely similar to *R. ishiharai* Yasumatsu, but can be distinguished by the longer eyes and the ferruginous, instead of black gaster.

ACKNOWLEDGEMENTS

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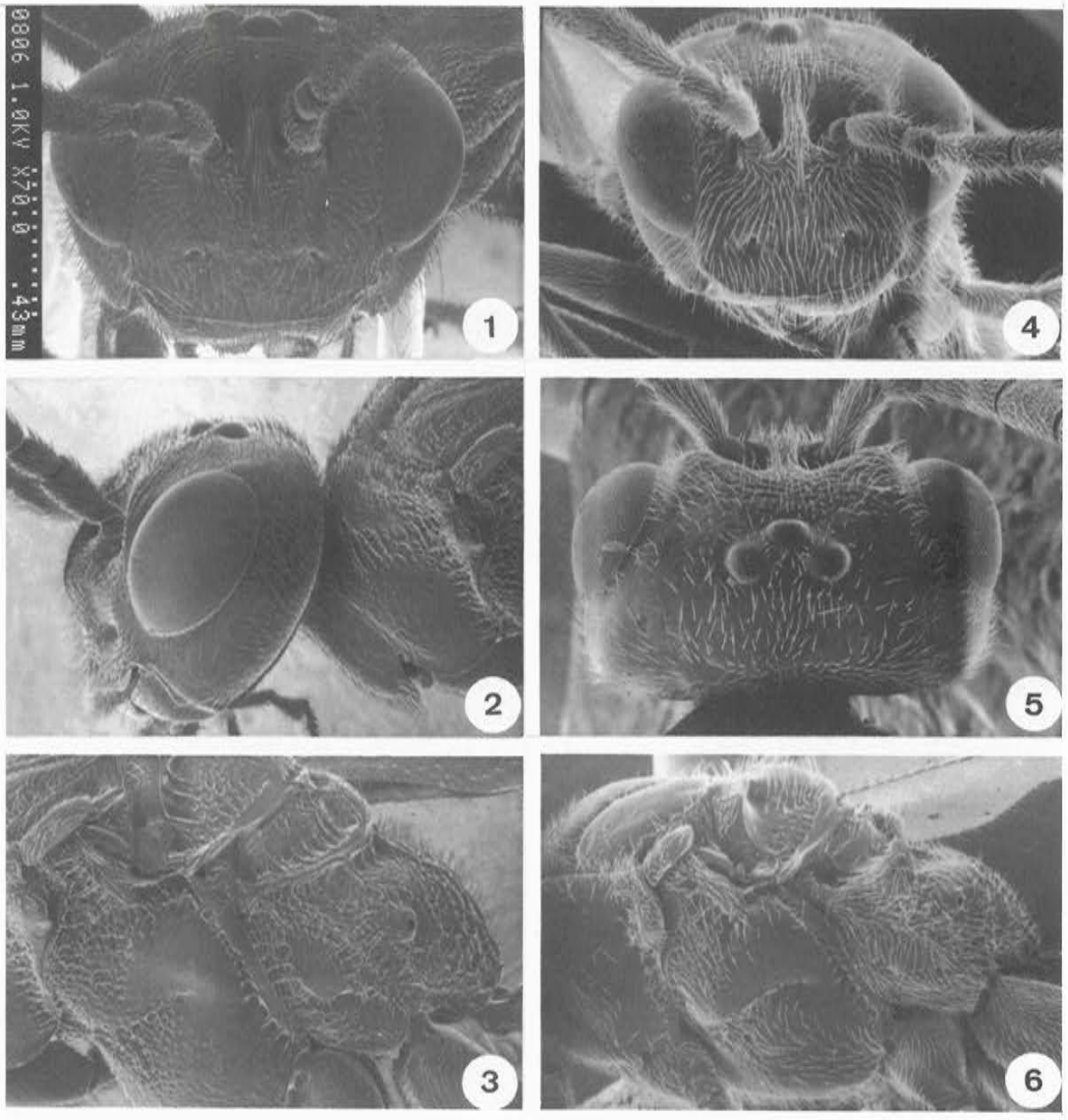
窄腹細蜂 *Ropronia* 屬之分類

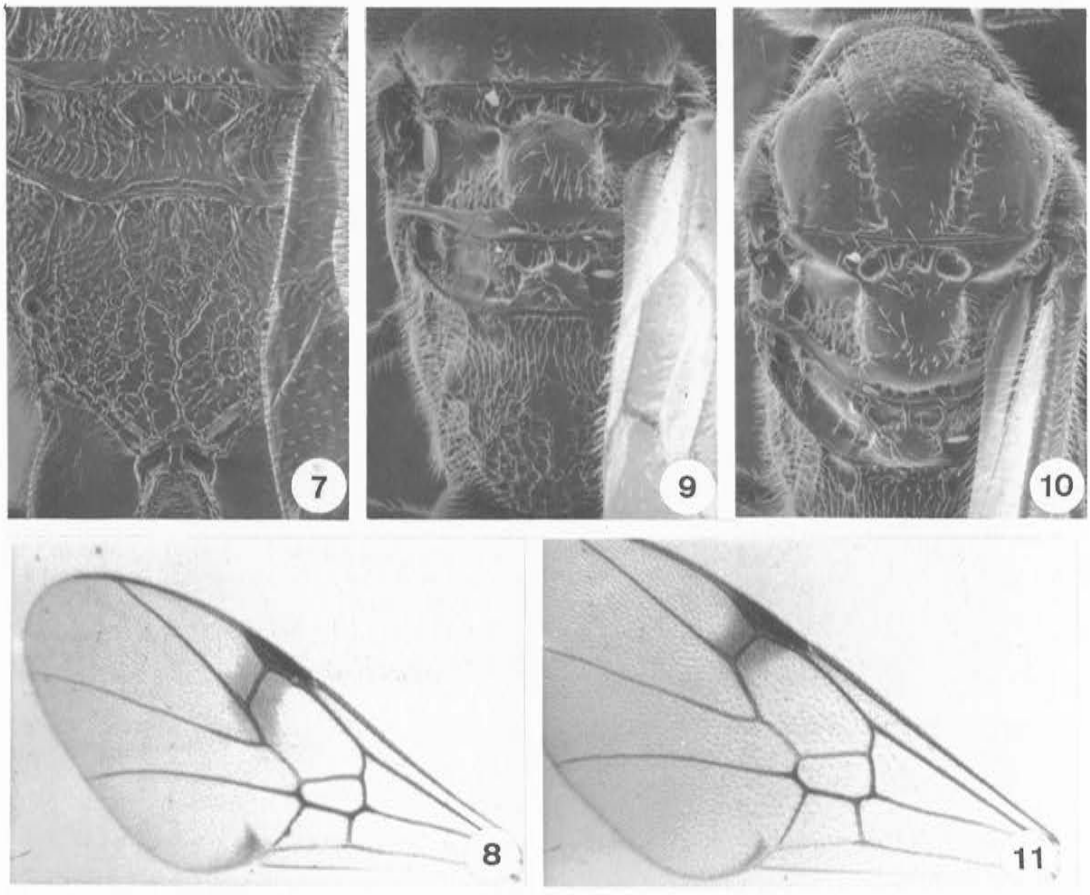
林 珪 瑞

中文摘要

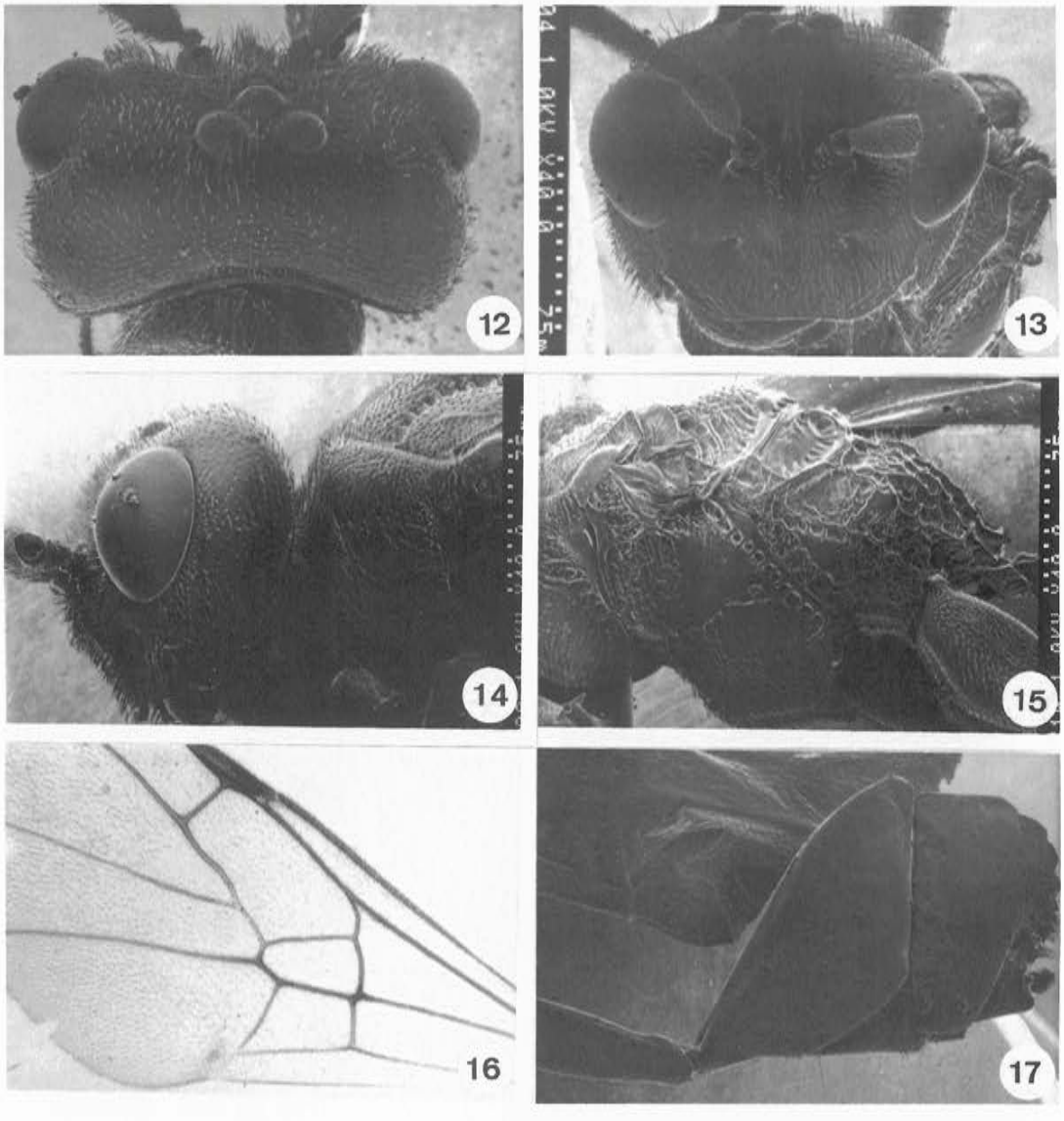
窄腹細蜂科 (Roproniidae) 唯有窄腹細蜂 1 屬，全世共有12種。本文記述臺灣 3 種及福建 1 種，包括寶島窄腹細蜂 *R. insularis* (臺灣)及馬氏窄腹細蜂 *R. maai* spp. nov. (福建)新種記載，並將臺灣發現之四川窄腹細蜂 *R. szechuanensis* Chao 及短角窄腹細蜂 *R. brevicornis* Townes 以及新種均以掃描電子顯微鏡(SEM)照相，並附全世界已知種之名錄及分種檢索表。



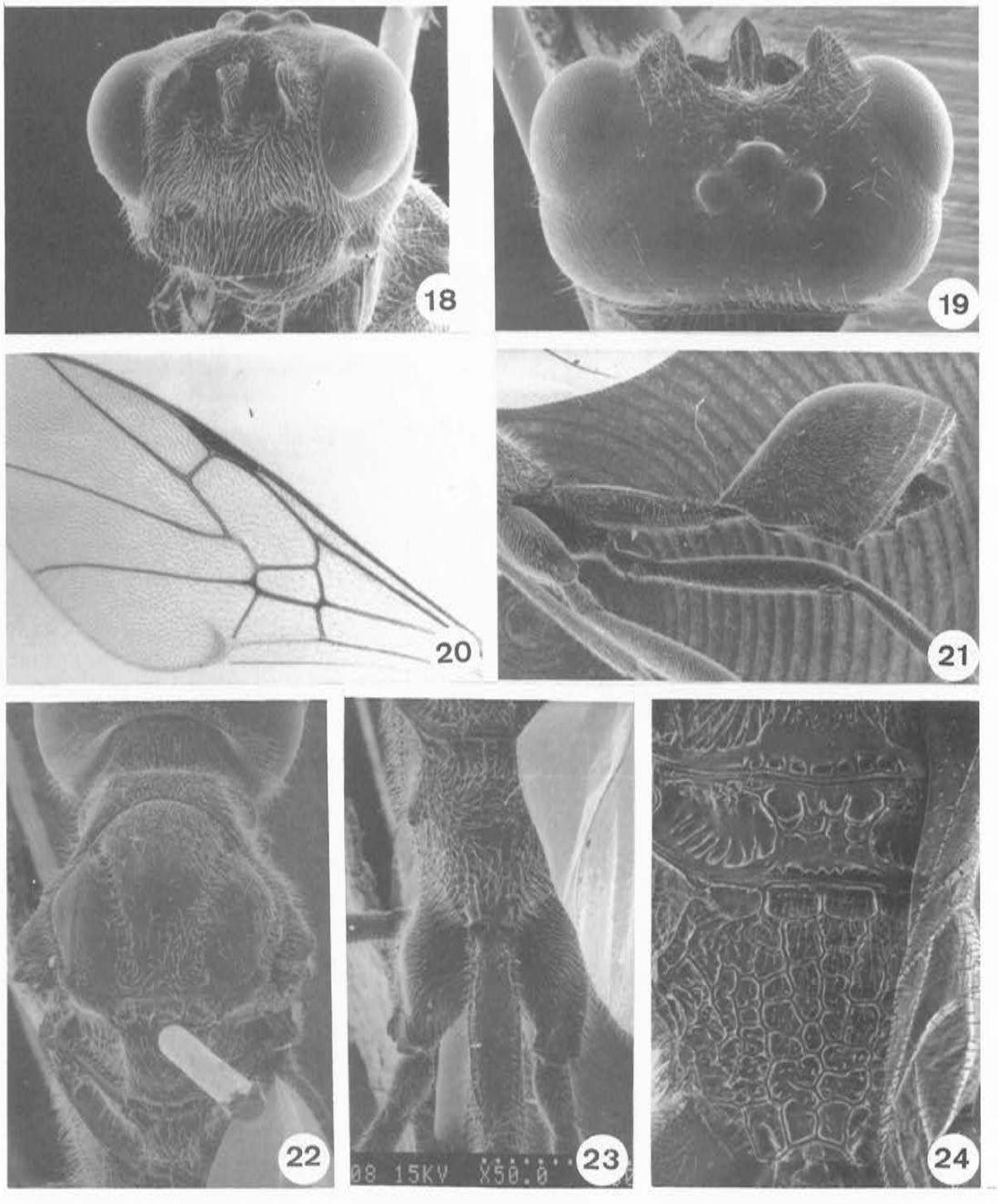
Figs. 1–6. *Ropronia brevicornis* Townes (1–3) male and *R. szechuanensis* Chao (4–6) male. 1, 4, heads in frontal view; 2, head and pronotum in lateral view; 5, head in dorsal view; 3, 6, thoraces in lateral view. (All specimens SEM, 1–3 uncoated 1 kv; 4–6 gold coated 15 kv)



Figs. 7–11. *Ropronia brevicornis* Townes (7–8) male and *R. szechuanensis* Chao (9–11) male. 7, 9, 10, thoraces in posterodorsal view (7, 9) and 10 in dorsal view; 8, 11, fore wings. (Specimens SEM, 7 uncoated 1 kv; 9, 10 gold coated 15 kv)



Figs. 12–17. *Ropronia maai* sp. nov., holotype, female. 12, 13, heads in dorsal and frontal view; 14, head and pronotum in lateral view; 15, thorax in lateral view; 16, fore wing; 17, gaster. (12–15, 17, specimens SEM, uncoated 1 kv)



Figs. 18–24. *Ropronia insularis* sp. nov., (18–23) paratype, female and *R. maai* sp. nov., (24) female. 18, 19, heads in frontal and dorsal view; 20, fore wing; 21, gaster; 22, thorax in dorsal view; 23, propodeum and gastral petiole in dorsal view; 24, metanotum and propodeum in posterodorsal view. (18–19, 21–23 specimens SEM, gold coated 15 kv; 24, uncoated 1 kv)

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ON THE GENUS *NOTHOSERPHUS* BRUES, 1940 (HYMENOPTERA: SERPHIDAE) FROM TAIWAN[1]

by
K. S. Lin[2]

Abstract: Of the eight Taiwanese species of the genus *Nothoserphus* Brues enumerated in this paper, *N. partitus*, *N. townesi*, *N. fuscipes* and *N. admirabilis* are new to science whereas *N. aequalis* Townes and *N. epilachnae* (Pschorn-Walcher) are new additions to the fauna of Taiwan.

INTRODUCTION

The genus *Nothoserphus* was originally erected by Brues (1940) for a single species (*mirabilis* Brues) from Taiwan. Since then the genus recorded and described from Eruope and Japan under the names *Thosmonina* Hellén and *Watanabeia* Masner, respectively, and the taxonomy was revised by Townes (1981) who synonymized *Thomsonina* and *Watanabeia*, divided the genus into 3 species-groups and recognized 7 species from the Palearctic and Oriental Regions. He also added a second Taiwanese species (*debilis* Townes).

The present report is based on the collection of the Taiwan Agricultural Research Institute, Taichung. Eight species are involved, including 4 new ones. The several hundreds of specimens used in the study were from different parts of the Island, especially the central parts. They were collected largely by sweepings and Malaise trap. The collectors are: B. H. Chen (BHC), C. C. Chen (CCC), K. C. Chou (KCC), L. Y. Chou (LYC), S. P. Huang (SPH), C. J. Lee (CJL), C. N. Lin (CNL), K. S. Lin (KSL), S. C. Lin (SCL), T. Lin (TL), C. C. Pan (CCP), W. S. Tang (WST), C. H. Wang (CHW), C. H. Yang (CHY). The involved localities (and their altitudes) are as follows. TAOYUAN Hsien: Paling 800–1,600 m. TAICHUNG Hsien: Anmashan 2,275 m, Lishan 1,900 m, Wuling 1,900 m, Kukuan 730 m, Wanfeng 50 m. HUALIEN Hsien: Tayuling 2,560 m, Fuli to Tungho (Taitung Hsien) 100–500 m. NANTOU Hsien: Tsuifeng 2,300 m, Meifeng 2,150 m, Sungkang 2,100 m, Tungpu 1,200 m, Wushe 1,150 m, Lushan 1,000 m, Hoshe 1,000 m. CHIAYI Hsien: Alishan 2,400 m, Fenkihu 1,370 m. PINGTUNG Hsien: Shantimen 100 m. TAITUNG hsien: Tawu 50 m.

Genus **NOTHOSERPHUS** Brues

Nothoserphus Brues, 1940:263. Type-species: *Nothoserphus mirabilis* Brues, by original designation.

Thomsonina Hellén, 1941:40. Type-species: *Proctotrupes boops* Thomson, by original designation. Synonymized by Townes, 1981:61.

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Watanabeia Masner, 1958:477. Type-species: *Disogmus afissae* Watanabe, by original designation. Synonymized by Townes, 1981:61.

Body stout. Head extremely short, transverse when viewed dorsally and subtriangular when viewed frontly. Clypeus, its anterior margin rounded and distinctly narrowly reflexed. Gena with a very strong ridge posteriorly. Upper temple gradually short. Occiput and posterior gena either flattened or depressed; occipital carina complete, its upper part close to foramen magnum. Mandible very small, frequently difficult to see. Antenna moderately long, flagellum in 11 segments, as in all members of Serphidae; tyloids elliptic or linear, weak or strongly elevated. Anterolateral portion of pronotum with a large swollen elevation, also with a vertical ridge connected anterolaterally. Notauli moderately short to long and deep. Mesopleural groove broad curved, smooth or foveate; posterior suture usually foveate; anterior and lower portions covered with fine hairs. Metapleuron with an anterodorsal smooth area that covers 0.2–0.5 of its surface. Anterior part of propodeum very short, with a long downward slope in profile. Stigma deep and short; radius descending vertically from lower corner of stigma, vertical part of radius about 0.4–1.3 as long as wide, turning at an acute angle obliquely toward costa; anterior margin of radial cell about 0.25–0.65 as long as depth of stigma; costa ending either at or just beyond apex of radius. Longer spur of hind tibia ending between basal 0.25–0.4 of hind basitarsus. Gaster with a stalk that is about 0.3–1.1 as long as wide. Base of syntergite often with a long median furrow and sometimes short lateral furrows. Ovipositor-sheath about 0.5 as long as hind tibia, sometimes short enough to be retracted.

This genus has been found in the Oriental and Palearctic Regions and is parasitic on the larvae of Scymninae and Epilachninae (Coleoptera: Coccinellidae).

Key to species-groups of *Nothoserphus*

1. Notauli extremely short, either about as long as or slightly longer than tegula. Metapleuron with a smooth area that covers at least 0.3 of its surface. . . . . ***boops***-group
– Notauli distinctly long, reaching past center of mesoscutum. Metapleuron with a smooth area that covers at most 0.2 of its surface. 2
2. Median lobe of mesoscutum with a foveate groove before notauli; hind ends of notauli separated by a narrow, wedge-shaped ridge near posterior disk. Area between postocelli either with a pair of weak rounded processes or a pair of strongly elevated spatulate processes. Side scrobe of pronotum coarsely rugose in and above sulcus. . . . . ***mirabilis***-group
– Median lobe of mesoscutum without a foveate groove before notauli; hind ends of notauli separated by about the length of tegula; area between postocelli rounded off posteriorly. Side scrobe of pronotum either almost smooth or weakly rugose in and above sulcus. . . . . ***afissae***-group

boops-group

Vertex rounded off posteriorly. Tyloids on male flagellar segments 2–7 elliptic, weakly convex or convex, smooth or with fine punctures. Notauli short, or longer than tegula; lacking a short groove before notauli. Prescutellar groove smooth or with longitudinal ridges. Upper anterior swelling of side of pronotum margined by a vertical ridge; side scrobe of pronotum smooth behind this swelling and in the sulcus. Metapleuron with a smooth area at least 0.35 of its surface, the rest coarsely rugose. Ovipositor-sheath about 0.4–0.5 as long as hind tibia.

Two species are heretofore known, one occurs in Europe and another in Japan, both are parasitic on the genus *Scymnus* of Coccinellidae. On this island we have at hand 3 new species.

Key to Taiwanese species of the *boops*-group

1. Prescutellar groove with 4 longitudinal ridges. Antenna mainly fulvous; flagellar segments 1–4 equal in length to one another; tyloids inconspicucous. Anterior foveate furrow of metapleuron as broad as posterior furrow of mesopleuron. Stigma discally pale-colored. . . . . ***partitus*** sp. nov.

– Prescutellar groove smooth, without longitudinal ridge. Antenna mainly brown; flagellar segments 1–4 not equal in length to one another. Tyloids on flagellar segments 2–7 or 4–6 smooth or with punctures. Anterior foveolate furrow of metapleuron narrow, not as broad as posterior foveate furrow of mesopleuron. Stigma brown. 2

2. Lower temple about 0.3 as long as eye. POL hardly longer than OOL (6:5.8). Legs except coxae mainly fulvous. Tyloids on flagellar segments 2–7 elliptic, convex and smooth. . . . . ***townesi*** sp. nov.

– Lower temple about 0.5 as long as eye. POL distinctly longer than OOL (7.8:5). Antenna and legs mainly fuscous. Tyloids on flagellar segments 4–6 elliptic, weakly convex, with minute punctures. . . . . ***fuscipes*** sp. nov.

Nothoserphus partitus Lin, sp. nov.
(Figs. 1, 4, 7, 10, 25)

Male: Fore wing 1.9 mm long. Frons smooth and shining, evenly convex, with very sparse minute setigerous punctures, upper lateral area slightly depressed. LOL:POL:OOL about as 3.3: 7.5:4. Temple markedly short, about 0.25 as long as eye. Relative lengths and widths of antennal segments about as 6:3; 2.4:2.4; 7:2; 6.5:2; 5.5:1.8; 5.5:1.8; 5.5:1.8; 5.5:2; 5:2; 5:2; 4.8:2; 4.7:2; 7:2; tyloids of flagellum inconspicuous.

Side scrobe of pronotum smooth and shining, with a raised vertical ridge, laterodorsal area rugulose behind swelling process, and reaching before tegula. Mesoscutum smooth, with rather dense punctures anteriorly and very sparse ones posteriorly. Notauli slightly longer than tegula; anterolateral furrow foveolate. Prescutellar groove deep, with 4 longitudinal ridges; scutellum smooth. Propodeum sloping downward posteriorly, relatively long, areolate, lacking lateral ridge, posterior disk with sculptures. Anterior furrow of metapleuron distinctly foveate, similar to posterior foveate furrow of mesopleuron; smooth area of metapleuron 0.3 of latter's surface.

Brownish black. Antenna gradually darkened toward apex, under surface fulvous. Lower portion of mesopleuron and gaster dark brown, lateral angle of pronotum before tegula and lower portion brown. Wings hyaline, margin of stigma and veins fulvous, stigma discally pale-colored; tegula and legs fulvous, terminal tarsomeres dark brown.

Female: Unknown.

Holotype ♂, Central Taiwan: Nantou Hsien, Tungpu, 18–23. XI. 1981 (TL & WST).

Nothoserphus townesi Lin, sp. nov.
(Figs. 2, 5, 8, 11, 26)

Female: Fore wing 1.8–2.4 mm long. Frons smooth and shining, with very sparse minute setigerous punctures; upper frons weakly evenly convex in profile; temple about 0.3 as long as eye; LOL:POL:OOL about as 2.8:6:5.8. Relative lengths and widths of antennal segments about as 8:4; 2:3; 7:2.8; 6:2.8; 5.8:2.8; 5.7:2.8; 5:2.8; 5.4:3; 5:3; 4.5:3; 4.5:3; 4.5:3; 8:3.3.

Side scrobe of pronotum smooth and shining, with raised vertical ridge anterodorsally, and a

few longitudinal rugulose behind that ridge; with setigerous punctures before tegula and spiracle. Notauli foveate anteriorly, shorter than tegula, usually with shallow broad furrow reaching almost to level of tegulae, anterolateral furrow shallow and smooth. Prescutellar groove smooth, without longitudinal ridge. Anterior furrow of metapleuron foveolate; smooth upper area occupying about 0.6 of its surface. Propodeum in profile with dorsal margin of upper part convexly curved, sloping downward posteriorly, areolate, lateral ridge present, posterior disk with distinct sculptures. Gastral stalk as long as high when viewed laterally; syntergite with dense minute punctures at posterior 0.2 of its surface. Ovipositor-sheath about 0.4 as long as hind tibia.

Brownish black. Under surface of antenna fulvous, 9 basal and 4 apical segments fuscescent; palpi gray; tegula and coxae fuscous; legs fulvous except tarsi dorsally and terminal tarsomeres fuscescent; wings hyaline, stigma and veins fuscous.

Male: Fore wing 1.8–2.0 mm long. Essentically similar to female, but distinctly darker; base of scape, pedicel, under surface of flagellomeres 1 and 2 more or less fuscescent. Relative lengths and widths of antennal segments about as 5.5:3.5; 2:3; 5.7:2.8; 5.5:2.8; 5.4:2.8; 5:2.7; 5:2.6; 5:2.6; 5:2.6; 4.8:2.4; 4.8:2.3; 4.4:2.3; 7:2.4; tyloids on flagellar segments 2–7 elliptic, smooth, about 0.6–0.7 as long as the segments.

Holotype ♀, Central Taiwan: Nantou Hsien, Tungpu 1,200 m, 28. IV-2. V. 1981 (TL & CJL).

Paratypes: Lishan, ♂, 26. VI. 1979 and Wuling, ♀, 27–29. VI. 1979 (KSL & LYC). 4♀♀, ♂, same data as holotype; 5♀♀, same locality as holotype but on 20–24. IV. 1982 (TL & KCC); 9♀♀, ♂, 19–23. VII. 1982 (LYC & TL); ♀, 18–21. X. 1982 (KCC & SCL); ♀, 10–14. I. 1983 (KCC & SPH); 10 ♀♀, 16–20. IV. 1984; 7♀♀, 23–27. VII. 1984 (KCC & CHY). Hoshe, 3♀♀, 22. VII. 1982 (LYC & TL). Lushan, ♂, 27–31. V. 1980 (KSL & LYC). Wushe, ♀, 7. V. 1984 (KCC & CCP). Sungkang, 2♂♂, X. 1984, Malaise trap (KSL & KCC). Meifeng, 2♀♀, 15. VII. 1982 (SCL & CNL); ♀, VI. 1984, Malaise trap (KSL & KCC). Tsuifeng, ♀, 16. VII. 1982 (SCL & CNL); ♀, 15–16. VIII. 1984 (KCC). Alishan, ♀, 17–20. VIII. 1982 (KCC & CCP); 6♀♀, 7–8. VIII. 1986 (KCC).

This species can be distinguished from *N. boops* Thomson by the presence of tyloids on flagellar segments 2–7 of the male. The name is in honor of Dr. H. Townes.

Nothoserphus fuscipes Lin, sp. nov.

(Figs. 3, 6, 9, 12, 27)

This and the preceding species are very closely related to each other, but they may be recognized by the characters mentioned in the key.

Female: Fore wing 1.9–2.3 mm long. Upper frons evenly convex in profile; lower temple about 0.5 as long as eye. LOL:POL:OOL about as 2.8:7.8:5. Relative lengths and width of antennal segments as 6.5:3.6; 2:3; 6.8:2.8; 6:2.8; 6:2.8; 5.5:2.8; 5.3:2.8; 5.4:3; 5.4:3; 4.8:3.1; 4.8:3.1; 4.4:3.1; 9:3.2.

Anterodorsal vertical ridge of pronotal side scrobe weak, with short rugulose behind it. Anterior furrow of metapleuron smooth or weakly foveolate. Propodeum areolate-rugulose, in profile its anterior part strongly curved while posterior part flattened; lateral ridges parallel to one another, posterior disk weakly sculptured, often smooth and shining at its lateral areas. Ovipositor-sheath about 0.4–0.5 as long as hind tibia.

Brownish black; fuscous on antenna (scape black), side of pronotum before tegula, lower portions of meso- and metapleuron, legs and gaster; fuscescent on apex of pedicel, lower surface of flgellomere 1, inner surface of fore femur, base and under surface of fore tibia, both ends of mid femur, mid and hind tibiae, all tarsi venterally and terminal tarsomeres. Wings hyaline, stigma and veins fuscous.

Male: Fore wing 1.8–2.2 mm long. Relative lengths and widths of antennal segments as 6:3.5; 2.5:2.2; 6.8:2.8; 5.5:2.8; 5.5:2.8; 5.5:2.8; 5.5:2.8; 5.5:2.5; 5.8:2.5; 5.8:2.5; 5.7:2; 5.5:2; 9:2; tyloids on flagellar segments 4–6 weakly raised, with minute punctures, about 0.7 as long as the segments.

Holotype ♀, Central Taiwan: Tsuifeng, X. 1985, Malaise trap (KSL).

Paratypes: Tayuling, 2♂♂, 24–26. VI. 1977 (KSL); 2♀♀, 10–16. VI. 1980 (KSL & BHC); ♀, 3♂♂, 10–15. IX. 1980; ♂, 12–16. IX. 1980, Malaise trap (KSL & CHW). Anmashan 2♀♀, 6–9. VII. 1979 (LYC). Tsuifeng, ♂, 1–3. VIII. 1981 (TL & WST); ♀, VII. 1984, Malaise trap (KSL & KCC); 2♀♀, same data as holotype. Meifeng, ♀, XI. 1985, Malaise trap (KSL). Sungkang, ♀, X. 1984, Malaise trap (KSL & KCC).

afissae-group

Vertex rounded off posteriorly. Tyloids on male flagellar segments 4–8, 5–7 or 5–8, each like an elevated carina, extending from base of the involved segment to a small tooth near its apex. Upper anterior swelling on side of pronotum with a sharply rounded edge, surface behind the swelling smooth or almost so. Side scrobe of pronotum smooth or more or less wrinkled. Notauli posteriorly reaching center of mesoscutum, their posterior ends separated by a distance about the length of tegula. Median lobe of mesoscutum lacking a short foveate groove before notauli. Prescutellar groove with or without a pair of longitudinal ridges. Metapleuron coarsely rugose throughout or with a smooth upper anterodorsal corner. Ovipositor-sheath very short, usually invaginated.

Four species have so far been described from Japan and the Oriental Region where are known as parasites of phytophagous coccinellids of the species-group. Of the three species enumerated below, two are new to Taiwan.

Key to Taiwanese species of the *affissae*-group

1. Prescutellar groove without longitudinal ridges; gastral tergits following the syntergite with fine punctures only. . . . . ***aequalis*** Townes
– Prescutellar groove with one strong submedian longitudinal ridge; gastral tergites following the syntergite with both fine and coarser punctures. 2
2. Lower temple about 0.4 as long as eye, POL:OOL about 9:8.5. Of male, tyloids present on flagellar segments 4–8. . . . . ***debilis*** Townes
– Lower temple about 0.5 as long as eye, POL:OOL about 7:8. Of male, tyloids found on flagellar segments 5–7. . . . . ***epilachnae*** (Pschorn-Walcher)

Nothoserphus aequalis Townes
(Figs. 13, 16, 19, 22, 18)

Nothoserphus aequalis Townes, 1981. Mem. Amer. Ent. Inst. 32:66. Holotype ♀, from Nepal, deposited in Biosystematics Research Institute, Ottawa.

Length of fore wing of female 3.1–3.5 mm, of male 3.1–3.3 mm. Diameter of anterior ocellus about 4 micrometric units, LOL:POL:OOL about as 3:7:8. Lower temple about 0.4 as long as eye. Relative lengths and widths of antennal segments in female as 8:4; 3:4; 12.3:3.7; 11:3.7; 10:3.5; 10:3.5; 10:3.5; 9:3.6; 8:3.5; 8:3.2; 8:3.2; 7.5:3; 12.5:3. In male, as 7:4.5; 3.5:4; 12.6:4; 10:4; 10:4; 10:4; 9.5:3.5; 10:3.6; 8.5:3.5; 8.5:3.5; 8:3.2; 7.5:3.2; 12:3; tyloids on flagellar segments 5–8.

Distribution: Nepal, Taiwan.

Specimens examined: Paling, 2♀♀, 3–5. V. 1983 (KCC & CCP). Tungpu, ♀, 5–8. X. 1981 (TL & WST); ♀, 2♂♂, 19–23. VII. 1982 (LYC & TL); ♂, 18–21. X. 1982 (KCC & SCL); 3♀♀, 22–25. XI. 1982 (KCC & SPH); 2♀♀, 23–27. VII. 1984 (KCC & CHY); 3♂♂, X. 1985; ♀, XI. 1985; ♀, XII. 1985 Malaise trap (KSL). Fuli to Tungho, ♀, 9–11. XI. 1982 (KCC & SPH).

Nothoserphus debilis Townes
(Figs. 14, 17, 20, 23, 29)

Nothoserphus debilis Townes, 1981. Mem. Amer. Ent. Inst. 32:66. Holotype ♂ from Taiwan: Fenkinhu, deposited in B. P. Bishop Museum, Honolulu, Hawaii.

Length of fore wing of female 3.4–3.6 mm, of male 2.9–3.7 mm. Diameter of anterior ocellus about 3.5 micrometric units, LOL:POL:OOL about as 2.6:7:8; lower temple about 0.5 as long as eye. Relative lengths and widths of antennal segments in female as 7:3.4; 3:3.5; 12:3; 10:3; 9.6:3; 10.6:3; 10:3; 9.7:3; 8.5:3; 8.5:3; 7.5:3; 7.5:3; 11:3; in male as 8:4.5; 2.3:3.7; 12:3.5; 9.7:3.5; 9:3.5; 9.6:3.2; 8.5:3.2; 8.3:3.2; 8.3:3.2; 8.5:3; 7.8:3; 7.8:3; 13:3; tyloids present on flagellar segments 4–8.

Distribution: Nepal, Taiwan.

Specimens examined: Tsuifeng, 29♂♂, 21. VI. 1979 (KSL & BHC); 9♂♂, 25–27. VI. 1981 (KSL & WST); ♀, 1–3. IX. 1982 (LYC & KCC); 4♂♂, 23–25. VI. 1983 (KSL & SCL). Meifeng, ♂, 20–22. VI. 1979 (KSL & BHC); ♂, 7–9. V. 1981 (KSL & SCL); ♀, 22. V. 1982 (LYC). Mushe, ♀, 6–11. V. 1981 (KSL & SCL).

Nothoserphus epilachnae (Pschorn-Walcher)
(Figs. 15, 18, 21, 24, 30)

Watanabeia epilachnae Pschorn-Walcher, 1958. Beitr. z. Ent. 8:725, 727, 728. Holotype ♀, from Java: Lembang, deposited in the U. S. National Museum, Washington.

Nothoserphus epilachnae Townes, 1981. Mem. Amer. Ent. Inst. 32:67, key, redes., hosts.

Length of fore wing of female 3.1–3.8 mm, of male 2.9–3.8 mm. LOL:POL:OOL about as 3.8:9:8.5; diameter of anterior ocellus about 4 micrometric units, lower temple about 0.4 as long as eye. Antennal segments of female in the following relative proportions of lengths and widths 8:5; 3:4.5; 14:3.2; 13:3.2; 12.5:3.2; 12:3.2; 12:3.2; 11:3.2; 10:3.2; 9.5:3; 8:3; 8:3; 13:3; of male 8:5.5; 3:4.3; 15:4.4; 13:4.5; 12:4; 12:3.8; 11.5:3.8; 11.5:3.8; 11.5:3.8; 11:3.2; 10.5:3.2; 10:3.2; 15:3; tyloids found on flagellar segments 5–7. Male antennae more or less darker than female ones.

Hosts: *Epilachna admirabilis*, *E. vigintioctopunctata* (Coleoptera: Coccinellidae) phytophagous.

Distribution: Vietman; China: Yunnan (Kunming), Taiwan.

Specimens examined: Tayuling, ♀, 10–16. VI. 1980, Malaise trap (KSL & BHC). Tsuifeng, ♀, 4♂♂, 2. VI. 1979 (KSL & BHC); 3♀♀, 2♂♂, 3. VI. 1980 (LYC & CCC); 5♂♂, 25–27. VI. 1981 (KSL & WST); ♀, 2♂♂, 1–3. VIII. 1981 (TL & WST); ♀, 20. IV. 1983 (KCC & SPH); 3♂♂, 23–25. VI. 1983 (KSL & SCL); ♀, IX. 1984 Malaise trap (KSL & KCC). Meifeng, ♀, 8♂♂, 2–4. VI. 1980 (LYC & CCC); 2♀♀, ♂, 7–9. V. 1981 (KSL & SCL); ♂, 24–26. VI. 1981 (KSL & WST); 2♀♀, 22. V. 1982 (LYC); ♂, 22–23. VI. 1983 (KSL & SCL). Sungkang, ♂, X. 1984 Malaise trap (KSL & KCC); ♀, X.

1985; ♀, XI. 1985, Malaise trap (KSL). Wushe, ♀, 11–15. IX. 1984 (KSL). Tungpu, ♂, 28. IV-2. V. 1981 (TL & CJL); ♂, 18–23. XI. 1981 (TL & WST); ♀, 20–24. IV. 1982 (TL & KCC); ♀, 18–21. X. 1982 (KCC & SCL).

mirabilis-group

Head strongly depressed behind anterior ocellus, with a pair of strongly elevated spatula-like processes or with a pair of weakly rounded processes between postocelli. Tyloids elliptic, usually small, hardly raised, found on flagellar segments 4–7 or 4–8. Upper anterior swelling of side of pronotum bordered by a vertical ridge. Side of pronotum behind the upper anterior swelling coarsely punctate-rugose; side scrobe of pronotum with short, coarse, irregular wrinkles. Notauli extending caudad beyond center of mesoscutum, their hind ends separated from one another by a narrowly wedge-shaped ridge. Median lobe of mesoscutum with a foveate groove before notauli. Prescutellar groove with two longitudinal ridges. Metapleuron coarsely reticulate-rugose. Ovipositor-sheath about 0.24 as long as hind tibia, frequently invaginated.

Probably this species-group is confined to the Oriental Region, and its members are parasitic on aphidivorous coccinellids. Two species, both are now at hand, one of them is new to science.

Key to species of the *mirabilis*-group

1. Head with a pair of strong spatula-like processes between postocelli, area behind anterior ocellus strongly depressed. Median lobe of mesoscutum with a long, curved foveate groove before notauli. Tyloids on male flagellar segments 4–7, and situated near bases. . . . . ***mirabilis*** Brues

– Head with a pair of weak rounded processes between postocelli, and not strongly depressed behind anterior ocellus. Median lobe of mesoscutum with a short straight foveate groove before notauli. Tyloids situated near midlength of each of male flagellar segments 4–8. . . . . ***admirabilis*** sp. nov.

Nothoserphus admirabilis Lin, sp. nov.

(Figs. 31–33, 37–39)

Male: Fore wing 2.6–2.8 mm long. Head with a pair of weak, rounded processes between postocelli. LOL:POL:OOL about as 4:10:6. Frons smooth, flattened, with or without a median furrow. Lower temple about 0.4 as long as eye. Relative lengths and widths of antennal segments about as 6.5:5; 3:3.5; 11:3.5; 9.5:3.5; 9.5:3.5; 8.7:3; 9:3; 8.8:3; 8.8:3; 8:2.8; 8:2.8; 7.6:2.5; 11:2.5; tyloids small, elliptic, weakly raised, situated near midlength of each of flagellomere 4–8. Side scrobe of pronotum with irregular wrinkles. Median lobe of mesoscutum with a short straight foveate groove before notauli. Mesopleural longitudinal groove smooth. Gastral syntergite with dense minute punctures at posterior 0.2.

Brown black, antenna and coxae fuscous; basal 4 segments of antenna more or less, palpi, tegula and legs fulvous, but all terminal tarsomeres fuscous. Wings hyaline, fore wing distinctly infuscate, veins fuscous.

Female: Unknown.

Holotype ♂, Central Taiwan: Sungkang, XI. 1984 Malaise trap (KSL & KCC).

Paratypes: Tungpu, ♂, 5–8. X. 1981 (TL & WST); ♂, 22–25. XI. 1982 (KCC & SPH). Shantimen, ♂, 31. I-4. II. 1983 (KCC & SPH).

This species can readily be recognized from the following one by the difference mentioned in the key.

Nothoserphus mirabilis Brues
(Figs. 34–36, 40–42)

Nothoserphus mirabilis Brues, 1940. Proc. Amer. Acad. Arts Sci. 73:263. Holotype ♂ from Taiwan: Taihorin, deposited Museum Comparative Zoology, Harvard Univ., Cambridge.

Nothoserphus mirabilis Townes, 1981. Mem. Amer. Ent. Inst. 32:68, key, redes., fig.

Length of fore wing of female 2.3–3.4 mm, of male 2.6–3.4 mm. LOL:POL:OOL about as 5:13.5:7; diameter of anterior ocellus about 4 micrometric units; lower temple about 0.4 as long as eye. Relative lengths and widths of antennal segments of female about as 9:5; 3:3.5; 13:3.5; 11:3.5; 10:3.5; 10:3.5; 10:3.5; 9.5:3.5; 9:3.5; 9:3.5; 8.5:3.5; 7.8:3.5; 11.5:3.5; of male about as 9:5; 3:3.5; 12:3; 10:3; 10:3; 9:3; 9:3; 9:3; 9:3; 9:3; 8:3; 8:2.5; 11:2.5. Tyloids weak, small, elliptic, situated near bases of male flagellar segments 4–7.

Host: Undetermined coccinellid larvae.

Distribution: Taiwan, Nepal, Java.

Specimens examined: Anmashan, 3♀♀, 6–9. VII. 1979 (LYC). Wuling, ♂, 27–29. VI. 1979 (KSL & LYC). Kukuan, 4♀♀, ♂, 20–22. VI. 1978 (KSL & KCC). Wanfeng, 20 ♀♀, 97♂♂, 2–20. I. 1979 (KSL); 2♀♀, ♂, V. 1979, ex pupa of an undetermined coccinellid on soybean (KSL). Tayuling, ♀, 10–16. VI. 1980 (KSL & BHC); ♀, 12–15. IX. 1980 (KSL & CHW). Tsuifeng, ♀, ♂, 3. VI. 1980 (LYC & CCC); ♀, 1–3. VIII. 1981 (TL & WST); 2♂♂, 5. VIII. 1984 (KSL); ♂, 15–16. VIII. 1984 (KCC). Tungpu, ♀ 23–27. VII. 1984 (KCC & CHY); ♀, ♂, IX. 1985, Malaise trap (KSL). Wushe, ♀, 23–25. VI. 1981 (KSL & WST); 2♀♀, ♂, 11–15. IX. 1984 (KSL). Lushan, 3♂♂, 27–31. V. 1980 (KSL & LYC). Shantimen, ♀, 1–5. III. 1982 (KCC & CCP); ♀, 31. I-4. II. 1983 (KCC & SPH); 2♀♀, ♂, 16–20. I. 1984 (KCC & CCP). Tawu, ♂, 12–14. II. 1981 (LYC & KCC).

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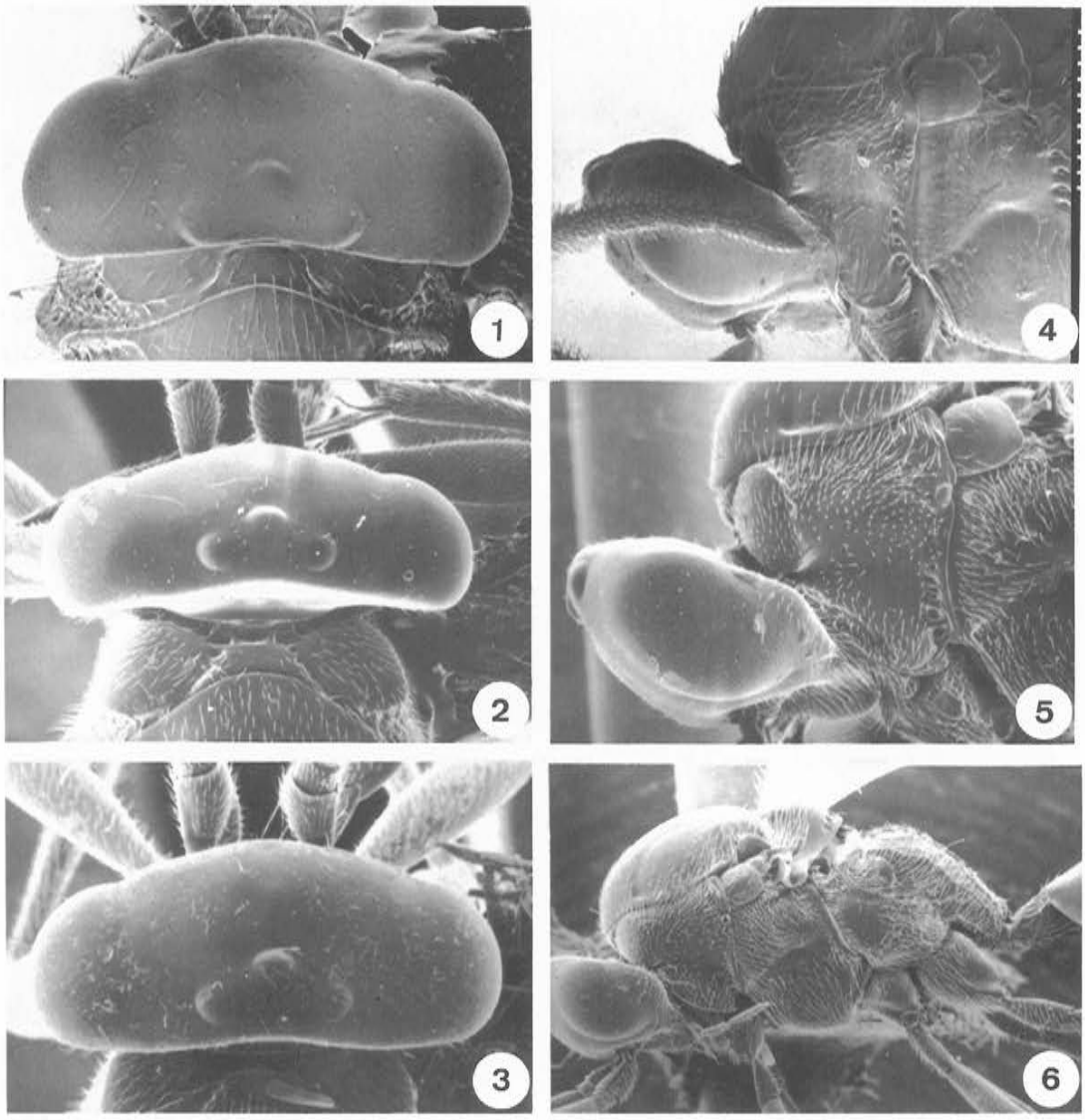
臺灣 *Nothoserphus* 屬細蜂之分類

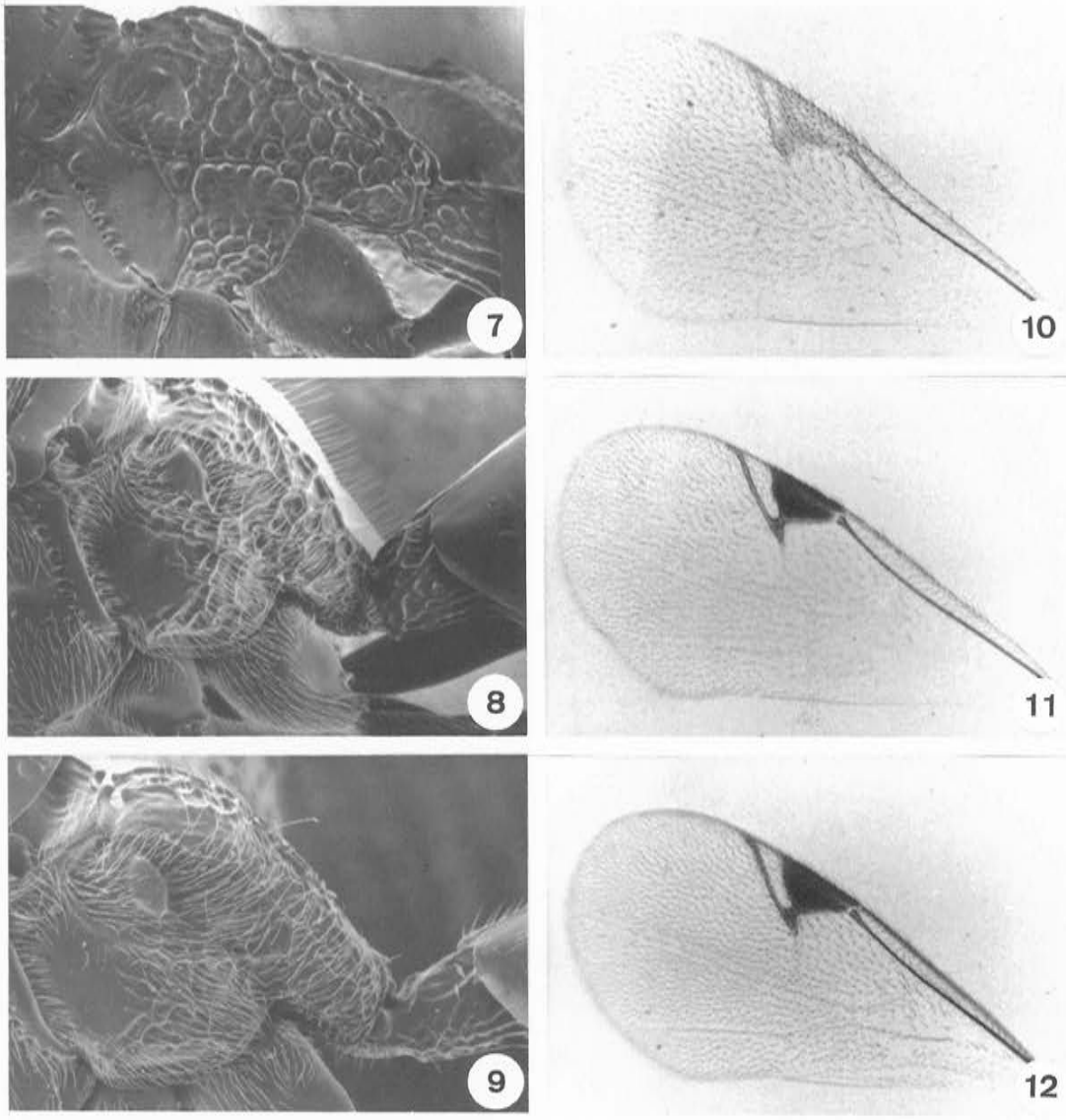
林 珪 瑞

中文摘要

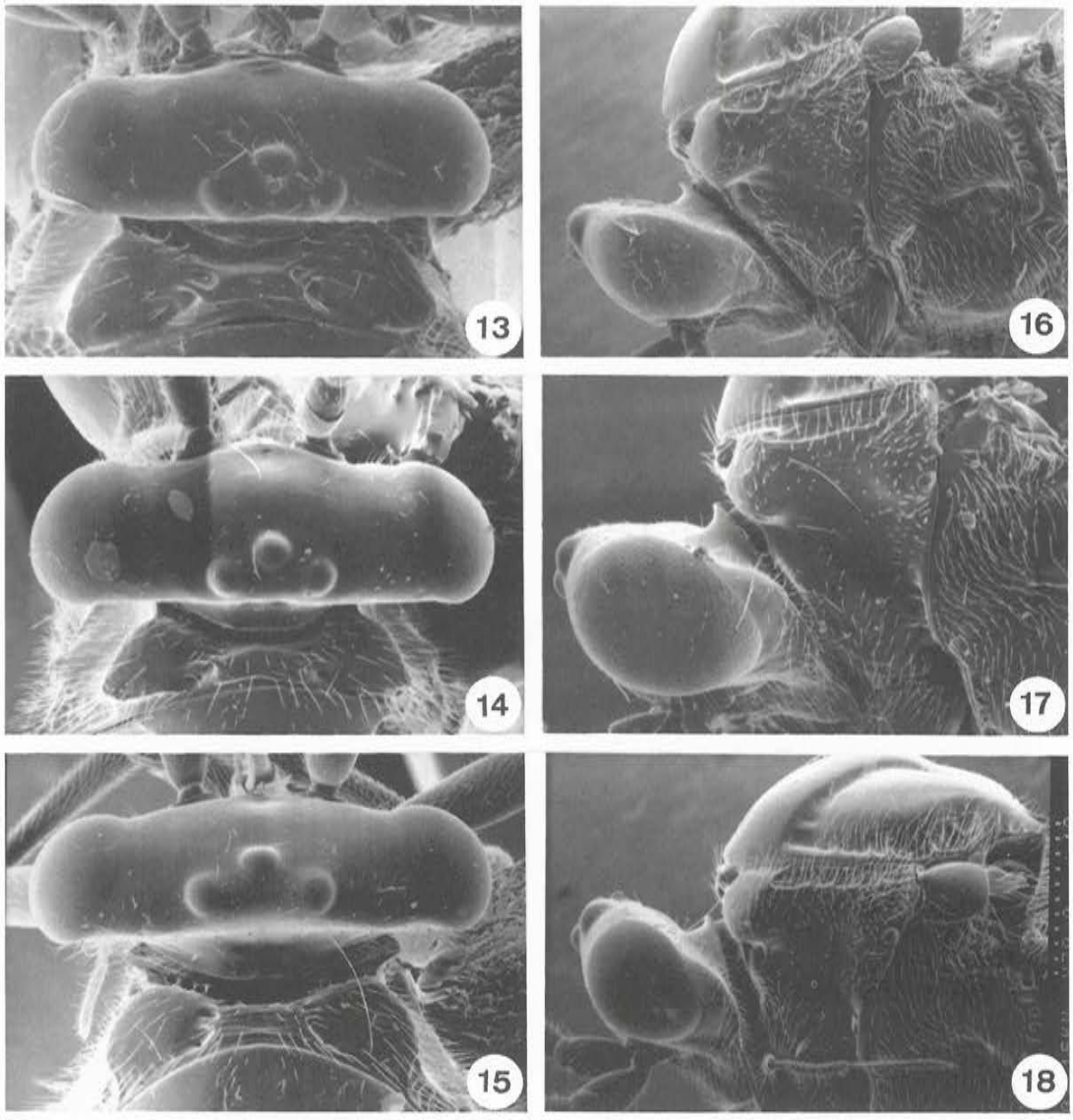
*Nothoserphus*屬係隸於細蜂科(Serphidae)，臺灣產者有：分溝細蜂*N. partitus*湯斯細蜂*N. townesi*褐足細蜂 *N. fuscipes*及圓突細蜂 *N. admirabilis* spp. nov.等 4 新種；光溝細蜂 *N. aepualis* Townes 瓢蟲細蜂 *N. epilachnae* (Pachorn-Walcher) 2 種爲臺灣新記錄及已有記錄之淺溝細蜂 *N. debilis* Townes及雙突細蜂 *N. mirabilis* Brues 共 8 種。本文詳細記述屬、種群、種之分類特徵及檢索表。各主要特徵並以掃描電子顯微鏡(SEM)照相供參考。



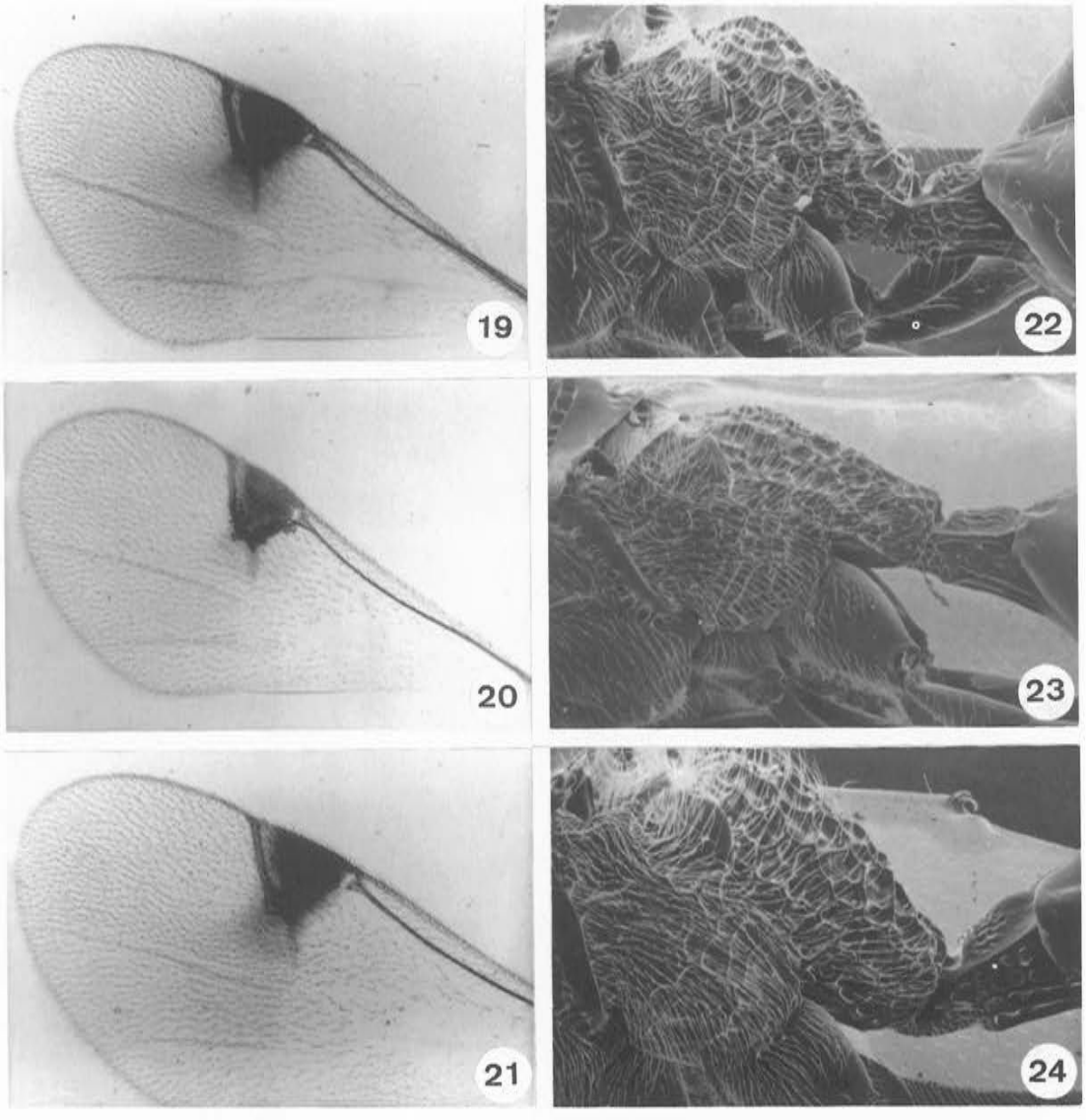
Figs. 1–6. *Nothoserphus partitus* (1, 4) holotype, female, *N. townesi* (2, 5) and *N. fuscipes* (3, 6) spp. nov., paratypes, female. 1–3, heads in dorsal view; 4–5, heads and part thoraces, and 6, thorax in lateral view. (All specimens SEM, gold coated 15 kv except 1, 4 uncoated 1 kv)



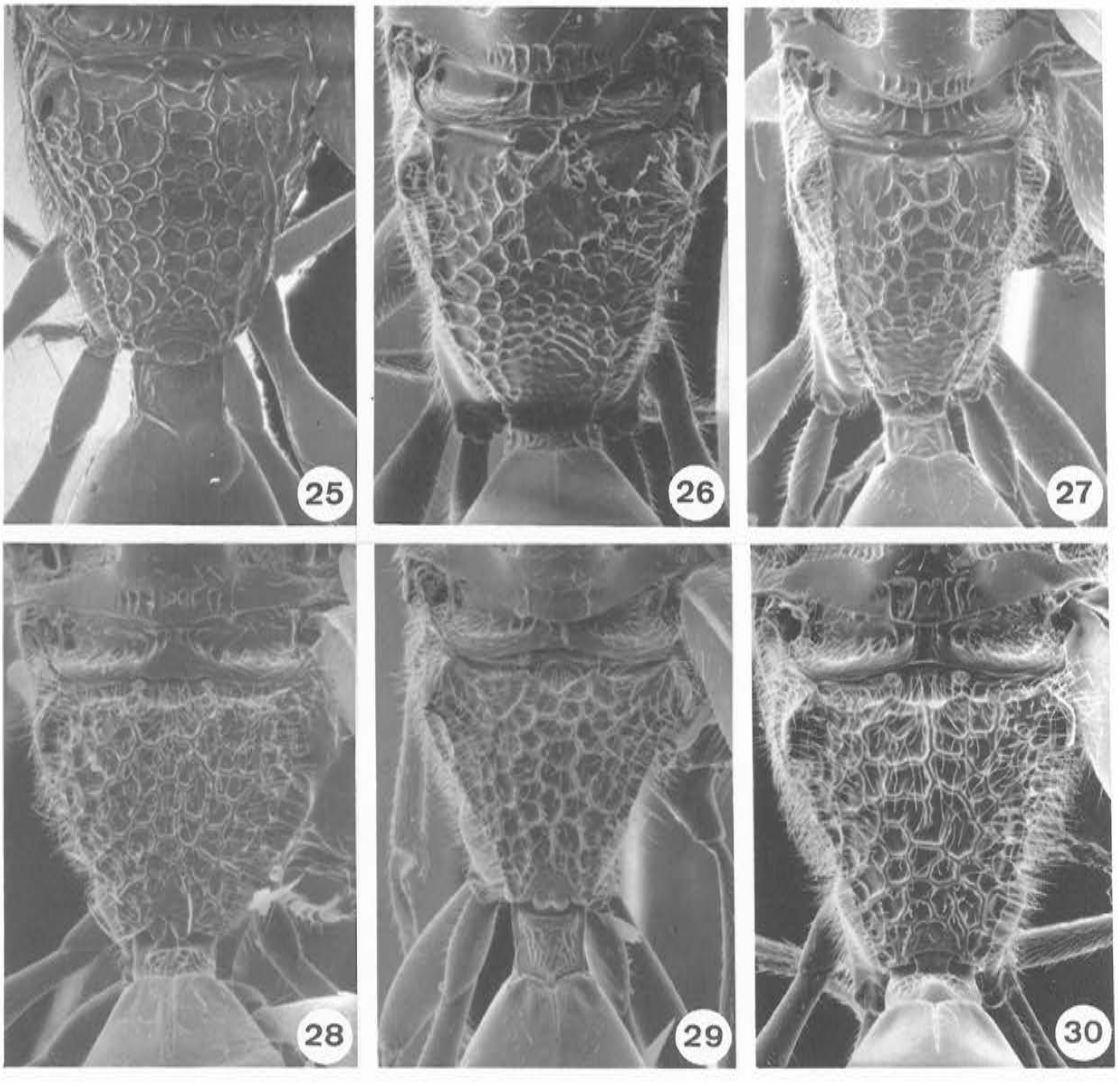
Figs. 7–12. *Nothoserphus partitus* (7, 10) holotype, female, *N. townesi* (8, 11) and *N. fuscipes* (9, 12) spp. nov., paratypes, female. 7–9, metapleura, propodeums and gastral stalks in lateral view; 10–12, fore wings. (All specimens SEM, 8, 9 gold coated 15 kv; 7 uncoated 1 kv)



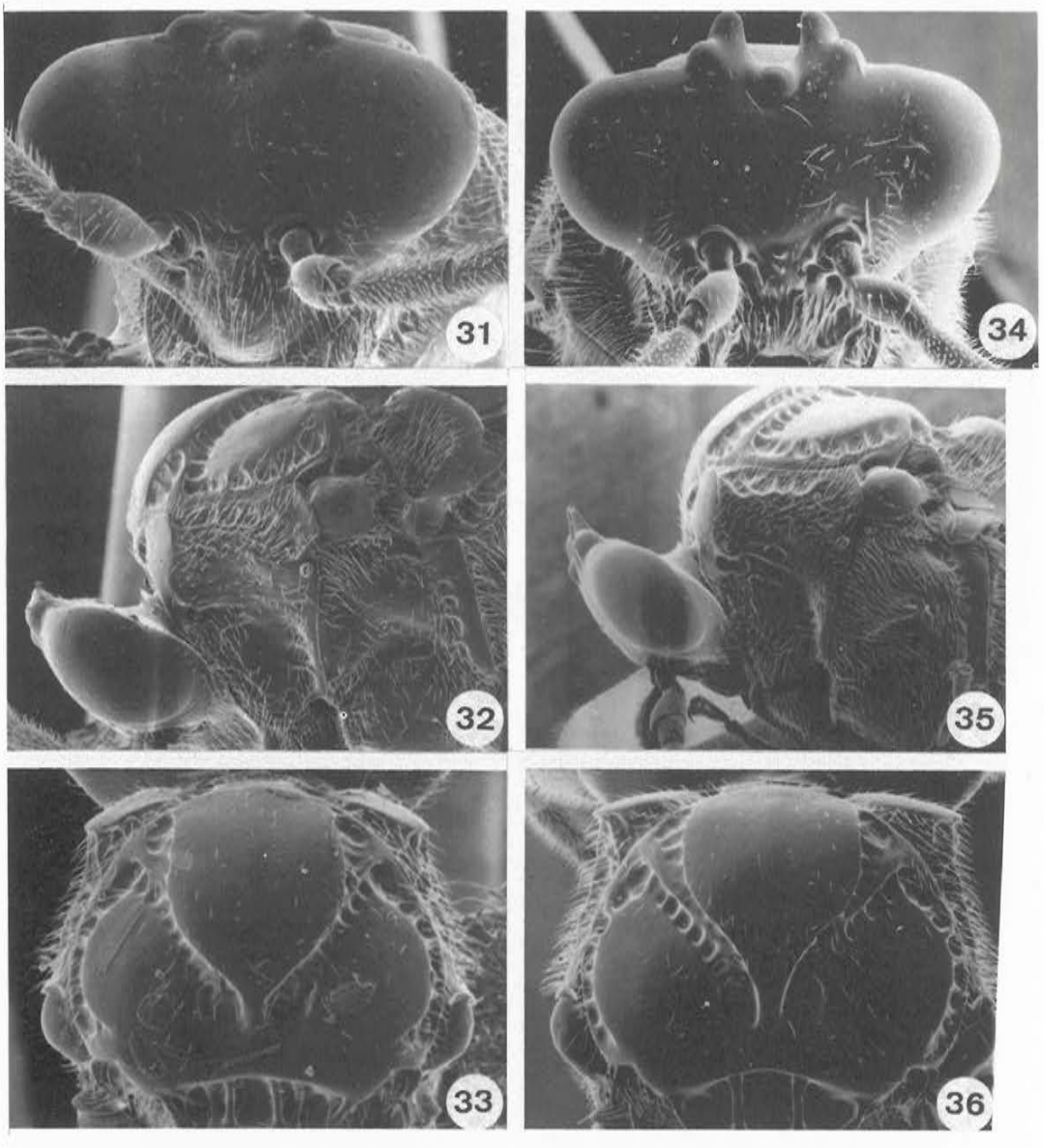
Figs. 13–18. *Nothoserphus aequalis* Townes (13, 16) *N. debilis* Townes (14, 17) *N. epilachnae* (Pschorn-Walcher) (15, 18). 13–15, heads in dorsal view; 16–18, heads and part thoraces in lateral view. (All specimens SEM, gold coated 15 kv)



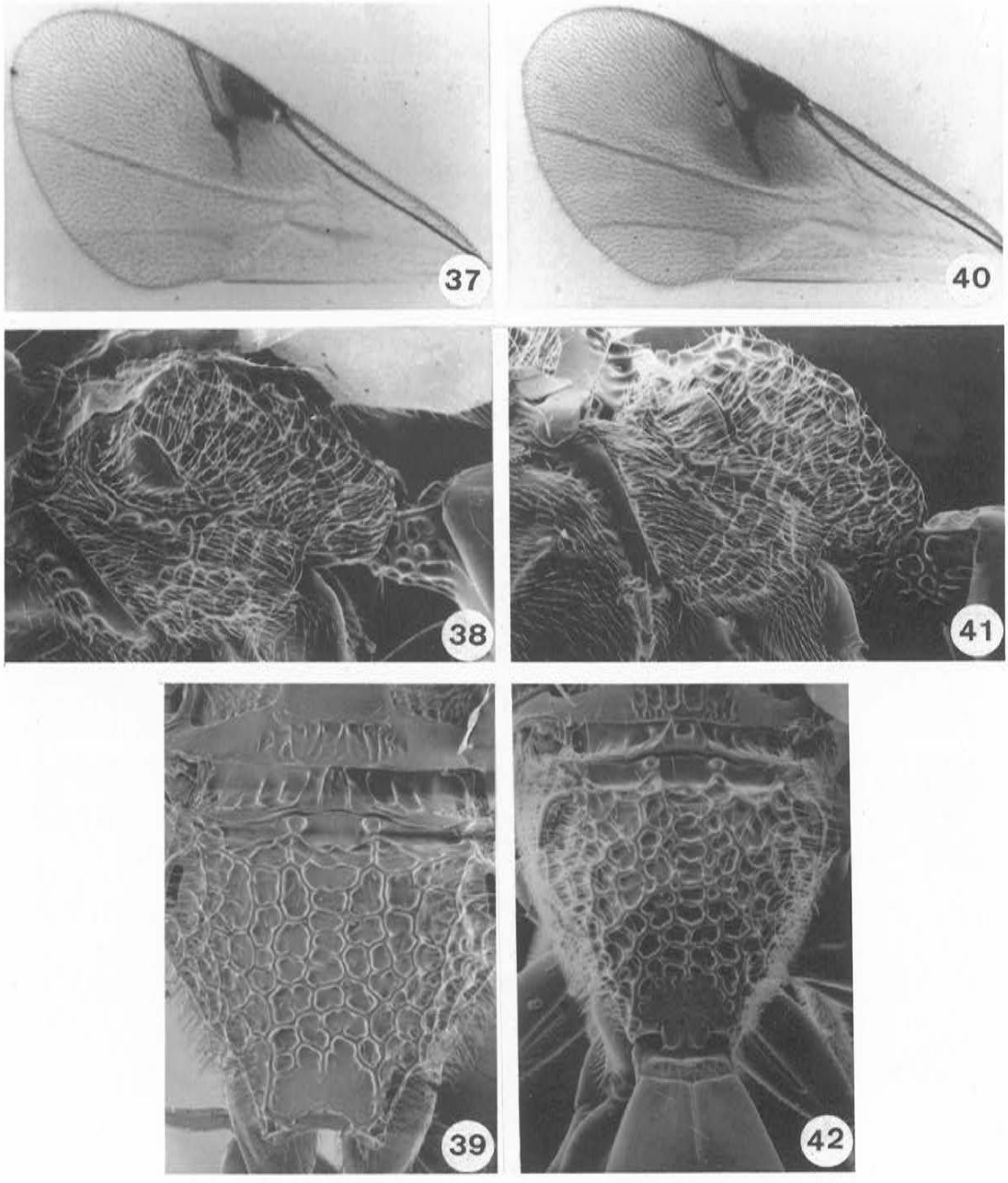
Figs. 19–24. *Nothoserphus aequalis* Townes (19, 22), *N. debilis* Townes (20, 23) and *N. epilachnae* (Pschorn-Walcher) (21, 24). 19–21, fore wings; 22–24, metapleura, propodeums and gastral stalks in lateral view. (22–24 all specimens SEM, gold coated 15 kv)



Figs. 25–30. Propodeums and bases of gaster. *Nothoserphus partitus* (25), *N. townesi* (26), *N. fuscipes* (27) spp. nov., *N. aequalis* Townes (28), *N. debilis* Townes (29) and *N. epilachnae* (Pschorn-Walcher) (30). (All specimens SEM, gold coated 15 kv except 25 uncoated 1 kv)



Figs. 31–36. *Nothoserphus admirabilis* sp. nov. (31–33) male, paratype and *N. mirabilis* Brues (34–36) female. 31, 24, heads in frontal view; 32, 35, heads and part thoraces in lateral view; 33, 36, mesoscuta in in dorsal view. (All specimens SEM, gold coated 15 kv)



Figs. 37–42. *Nothoserphus admirabilis* sp. nov. (37–39) male, paratype and *N. mirabilis* Brues (40–42). 37, 40, fore wings; 38, 41, metapleura, propodeums and gastral stalks in lateral view; 39, 42, propodeums in posterodorsal view. (38, 41, 42 all specimens SEM, gold coated 15 kv; 39 uncoated 1 kv)

Taiwan Agric. Res. Inst., Spec. publ. No. 22: 67–79 23 May 1987

AGANASPIS, A NEW GENUS OF EUCOILIDAE (HYMENOPTERA: CYNIPOIDEA)[1]

by
K. S. Lin[2]

Abstract: The new genus *Aganaspis* is erected for the reception of *Trybliographa daci* Weld, 1951 and its relatives. *A. contracta*, *A. ocellata* and *A. major* from Taiwan are described as new; a synoptic key and a number of SEM illustrations for the four species are presented along with the redescription/descriptions.

INTRODUCTION

While reviewing the genus *Trybliographa* Förster, 1869, Kerrich & Quinlan (1960) and Nordlander (1981) found *T. daci* not a typical member and suggested that it might justified to be placed in an independent genus. They pointed out that the third segment of male antenna in *daci* was bent and distinctly longer than the fourth, and the scutellar cup, in both sexes, was unusually large and overhanging behind the scutellum proper. A study on a pair of paratypes of *daci* together with its three related species (all undescribed) in the collection of the Taiwan Agricultural Research Institute verified the findings by those three authors. Consequently a new genus is erected herewith, and the three new species are described along with the redescription of *A. daci* Weld (comb. nov.).

The present report is base on the collection of the Taiwan Agricultural Research Institute, Taichung. It includes 3 new species, which are fully described and illustrated and are compared with both sexes of *A. daci* (Weld) of Malaya.

The Taiwanese specimens used in the study were collected mostly from the central parts of the Island. They were obtained largely by sweepings amongst vegetation and by using of malaise traps. The involved collectors are: K. C. Chou (KCC), L. Y. Chou (LYC), S. P. Huang (SPH), C. J. Lee (CJL), K. S. Lin (KSL), S. C. Lin (SCL), T. Lin (TL), C. C. Pan (CCP), W. S. Tang (WST), C. H. Wang (CHW), C. Y. Wong (CYW), C. H. Yang (CHY), F. L. Yu (FLY). The involved localities (and their altitudes) are as follows. TAIPEI Hsien: Paomenszu 50 m, 2 km S. of Keelung City; Hsintien 50 m, 20 km S. of Taipei City; Chingtan 50 m, near Hsintien. Taipei City 50 m. TAICHUNG Hsien: Chiapaotai 750 m; Wangfeng 50 m. NANTOU Hsien: Meifeng 2,150 m; Tungpu 1,200 m; Chitou 1,150 m; Wushe 1,150 m; Hoshe 1,000 m; Lushan 1,000 m; Lienhuachih 650 m. HUALIEN

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Hsien: Fuli to Tungho (TAITUNG Hsien) 100–500 m.

The terminology follows Weld (1952), Nordlander (1982a) and Quinlan (1986). The relative mensurements throughout the paper were made under an ocular micrometer at same magnification, 40 units = 1 mm.

Genus **AGANASPIS** nov.

Type-species: *Aganaspis ocellata* Lin, sp. nov. present designation.

Body compressed bilaterally, smooth and polished. Eye large, more or less prominent, covered with scattered hairs. Vertex and occiput also with scattered hairs. Head in facial view longer than wide; malar suture present, gena convex, rounded off posteriorly. Antenna of female 13-segmented, short, moniliform, with hairs, segment 3 markedly longer than 4, club 8 or 9-segmented, with rhinaria. Antenna of male 15-segmented, filiform, flagellomeres somewhat elliptical, segment 3 very long, bent, dilated distally, distinctly longer than 4, the rest subequal in length, segments 3–15 with rhinaria.

Pronotal plate large, with median bridge and a large fovea on each side, open laterally; dorsal margin of posterior part broadly concave; side of pronotum anteriorly with a tuft of vertical pubescence, posteriorly with scattered hairs. Mesoscutum moderately convex, anterior parallel lines very weak or absent, notauli entirely absent, but with scattered notaulic hairy lines, lateral lines present. Lateral bar long, reaching almost 0.5 of scutellum, smooth, divergent posteriorly, posterior portion depressed and broad in lateral view; lateral depression well-defined posteriorly. Scutellar fovea large, deep, smooth, almost as long as wide; with a fenestra under lateral bar. Scutellar cup very large, moderately elevated, overhanging behind rounded disc, tapering and declious anteriorly, with thin rim, dorsal surface smooth and weakly longitudinally convex, both lateral submargin with 2 or 3 hairs; posterior fovea large, nearly circular, its bottom weakly sculptured. Disc of scutellum foveate-rugose, virtually prependicular laterally and posteriorly, with uniseriate curved hairs dorsally. Metanotum entirely concealed under scutellum. Mesopleuron moderately convex or flattened, subalar pit absent, mesopleural suture weakly curved. Metapleuron smooth, with a large anteroventral cavity, metapleural suture depressed posteriorly, posterior margin raised, virtually straight, with a small cleft just at posterior end of metapleural suture, area behind posteroventral corner of metapleuron with pubescence. Propodeum short, rather densely pubescent, submedian ridges divergent and rather broadened posteriorly, acutly bulged outer sides; nucha rugose or smooth. Fore wing of normal shape or extremely long, surface moderately pubsescent and ciliate along margin; radial cell large, open on front margin. Legs of normal shape, relatively short, mid and hind coxae each with a tuft of dense uniseriate hairs on posterodorsal margin. Gaster compressed bilaterally, almost as long as thorax. Base of tergite 2 with a broad ring of dense hairs, which in dorsally complete in female, but incomplete in male; surface of tergite with some scattered hairs behind the ring. Base of tergite 3 broad in female and narrow in male.

Aganaspis is a member of the *Ganaspis*-group (as defined by Nordlander, 1982b) and the chief distinguishing characters are as memtioned above, the shape of the male antenna and of the scutellar cup. In addition, it may be noted that the radial cell in *Aganaspis* is entirely open on the anterior margin of the fore wing. The geographical range of the genus is probably very extensive in the Oriental Region but at present it is known only from Malaya, Hawaii (introduced) and Taiwan, and the only recorded host is *Dacus dorsalis* (Hendel) (Tephritidae).

Key to species of *Aganaspis*

1. Scutellar cup elliptical. Body in female strongly compressed bilaterally, in male weakly so. Head in dorsal view longer than wide in female, almost as long as wide in male. Club of female antenna 8-segmented. Fore wing with longest cilia on apical margin at least about 0.25 or 0.14 as greater width of wing in female and male. . . . . ***contracta*** sp. nov.
– Scutellar cup ovate or oblongo-ovate. Body in both sexes weakly compressed bilaterally. Head in dorsal view distinctly wider than long in both sexes. Club of female antenna 9-segmented. Fore wing with longest cilia on apical margin at most about 0.16 or 0.12 as greater width of wing in female and male. 2
2. Pronotal plate with anterior part distinctly narrower than posterior part, and the median bridge at most about 0.19 as wide as posterior part. Scutellar cup ovate. Of female, head in dorsal view about 1.36 as wide as long, weakly convergent behind eyes; ocelli arranged in near triangle. Of male, head in dorsal view about 1.5 as wide as long, convergent behind eyes; ocelli arranged in a lower triangle. . . . . ***ocellata*** sp. nov.
– Pronotal plate with both parts subequal wide, median bridge at least about 0.26 as wide as posterior part. Scutellar cup oblongo-ovate. Head in dorsal view distinctly wider than long, and ocelli always arranged in a broad triangle of both sexes. 3
3. Pronotal plate with its median bridge narrower, about 0.26–0.28 as wide as its posterior part. Antenna of female relatively long, segments 8–12 each distinctly longer than wide; of male, segment 4 distinctly shorter than 5. . . . . ***major*** sp. nov.
– Pronotal plate with its median bridge broader, about 0.31–0.33 as wide as its posterior part. Antenna of female relatively short, with segments 8–12 each strikingly shorter than wide; of male, segment 4 almost as long as 5. . . . . ***daci*** (Weld)

Aganaspis contracta Lin, sp. nov.
(Figs. 1–10, 39–40)

Female. Body length 1.7 mm, fore wing 1.5 mm. Very strongly compressed bilaterally. Head in dorsal view almost as wide as mesoscutum, distinctly longer than wide, 1.2 times as long as wide. Ocelli arranged an elongate triangle; diameter of anterior ocellus about 2 micrometric units, LOL: POL:OOL about as 3.5:3:5. Eye about 1.5 times as high as broad, weakly prominent, temple (in lateral view of head) 0.9 as long as eye; malar space 0.33 as long as height of eye. Antenna relatively short, about 2 times as long as height of head, club 8-segmented, with rhinaria; relative lengths and width of segments about as 4:1.9; 2.5:1.8; 2.5:1.6; 1.7:1.5; 1.8:1.6; 2.9:2.3; 2.9:2.4; 2.9:2.4; 2.9:2.4; 2.9:2.5; 2.9:2.5; 2.9:2.5; 4:2.7.

Ratio of dimensions of thorax as 3:1:2. Pronotal plate with its posterior part in profile forming an 95° angle with mesopleural suture; median bridge narrower than anterior ocellus, about 0.11 as wide as posterior part, the latter broader than anterior part, dorsal margin broadly concave. Mesoscutum longer than broad, about 1.6 times as long as wide. Scutellum 1.76 times as long as wide; lateral bar as long as width of scutellum, smooth; scutellar fovea as long as wide, smooth; scutellar cup elongate-elliptical, posterior fovea large, circular; with 4 hairs on posterior portion; scutellar disc with lateral margin. Mesopleuron flattened. Fore wing extremely long, about 3.8 times as long as maximum width; with longest cilia on apical margin about 0.25 as greater width of wing; radial cell 4.7 times as long as deep. Hind femur distinctly bilaterally compressed. Ratio of dimensions of gaster about 3.9:1:2.4, strongly compressed bilaterally; ring of dense hairs at base of tergite

2 slightly narrowed at upper lateral part; posterior 0.2 of tergite 2 with minute punctures.

Male. Body length 1.2 mm, fore wing 1.4 mm. Head slightly shorter than borad when viewed dorsally, about 0.7 as wide as long, vertex strongly elevated; diameter of anterior ocellus about 1.8 micrometric units, LOL:POL:OOL about 2:3.7:3.8; eye about 1.45 times as high as broad, moderately prominent, temple (in lateral view of head) about 0.66 as long as eye; malar space 0.2 as long as height of eye. Relative lengths and widths of antennal segments 1–8 and 14–15 about as 4:2; 2:2; 5:2; 3.7:2; 3.7:2; 3.7:2; 3.7:2; 3.8:2; 3.7:2; 3.5:2; segments 3–15 with rhinaria.

Pronotal plate with posterior part in profile forming an 95° angle with mesopleural suture and about 5 times as median bridge. Fore wing 2.7 times as long as greatest width; its longest cilia on apical margin about 0.14 as greatest width of wing; radial cell 3 times as long as deep. Hairy ring at base of tergite 2 narrow, incomplete dorsally; posterior 0.25 of the same tergite minutely punctate.

Head and thorax brown black; gaster ferruginous; antenna fuscous, legs fuscescent, venter of femora and tarsomeres 1–4 more or less fulvous fuscescent; hairs on body fulvous.

Distribution: Taiwan.

Holotype ♀, Central Taiwan: Nantou Hsien, Tungpu 1,200 m, 20–24. VI. 1983 (KCC & CYW).

Topotype: ♂, same data but X. 1985, Malaise trap (KSL).

As shown in the key, this new species can easily be distinguished from other ones of the genus in having the elliptical scutellar cup, the strongly compressed female body, the exceedingly narrow fore wing and its exceedingly long cilia.

Aganaspis ocellata Lin, sp. nov.
(Figs. 11–19, 41–42)

Female. Body 1.7–2.1 mm, fore wing 1.7–2.1 mm. Superficially similar to *major* and *daci*, but distinguishable in having smaller and laterally compressed body. Head in dorsal view thick, 1.36 times as wide as long, weakly narrowed behind eyes; ocelli arranged in a near triangle, diameter of anterior ocellus about 2.4 micrometric units, LOL:POL:OOL about as 2.8:5:3.5; temple (in lateral view of head) 0.8 as long as eye; eye 1.6 times as high as broad, malar space 0.3 as long as height of eye. Antenna with 9-segmented club, with rhinaria; relative lengths and widths of segments about as 4:2.5; 3:2.3; 3.8:1.9; 3:1.8; 3.6:2.3; 4:2.7; 4:2.8; 4:2.8; 3.5:2.8; 3.5:2.8; 3.6:3; 3.5:3; 5:3.

Ratio of dimensions of thorax about 1.7:1:1.3. Pronotal plate with posterior part in profile forming an angle 85° with mesopleural suture; median bridge of the plate 0.19 as wide as posterior part; anterior part with transverse wrinkles; posterior part distinctly wider than anterior part, with blunt angle laterally, median 0.3 of dorsal margin broadly concave. Mesoscutum as long as wide. Lateral bar smooth, outer margin rather sigmoid; scutellar cup ovate, posterior fovea 0.33 as wide as cup. Fore wing about 2.3 times as long as maximum width, its longest cilia on apical margin about 0.16 as long as greatest width of wing; radial cell 2.9 times as long as deep. Ratio of dimensions of gaster about 2.8:1:1.9; tergite 2 with minute punctures at posterior 0.2.

Male. Body 1.6–2.2 mm, fore wing 1.6–2.4 mm. Head in dorsal view wider than thorax (18:16), shorter than wide (12 x 18); ocelli arranged in a broad triangle, diameter of anterior ocellus 2.4 micrometric units, LOL:POL:OOL about as 2.5:4:4; eye about 11 x 8, temple about 0.53 as long as eye, malar space about 0.18 as long as height of eye. Relative lengths and widths of antennal segments 1–8 and 14–15 about 4.5:2.5; 2.5:2.5; 8:2.5; 4.5:2.4; 5:2.3; 5:2.3; 5:2.3; 5:2.2; 4.5:2; 5.5:2; segments 3–15 with rhinaria.

Posterior part of pronotal plate in profile forming an 85° angle with mesopleural suture; median bridge of the plate 0.28 as wide as posterior part, which is distinctly wider than anterior part. Mesoscutum as long as wide. Fore wing 2.4 times as long as greatest width, its longest cilia on apical margin about 0.12 as long as greatest width of wing; radial cell 2.7 times as long as deep. Gaster 1.35 times as long as deep; hairy ring at base of tergite 2 narrow and incompleted dorsally, posterior 0.3 of tergite 2 minutely punctate.

Black; antenna, tegula, mid and hind coxae fuscous, mandible and legs ferruginous, wings hyaline, vein fuscous. Body covered with rufous hairs, hairy ring at base of tergite 2 also rufous.

Distribution: Taiwan.

Holotype ♀, Contral Taiwan: Nantou Hsien, Lienhuachih 650 m, IX. 1984, Malaise trap (KSL & KCC).

Paratypes: ♀, Paomenszu, 16. VIII. 1958. Taipei, ♀, 15–19. IV; ♀, 1–12. VII; ♀, 26–31. VII; 5♀♀, VIII; ♀, 2–7. IX. 1963; ♀, 4. XI. 1974. Hsintien, ♀, VI. 1972. Chingtan, ♀, IX. 1968 (all above collected by author). Chiapaotai, 2♂♂, 14–18. X. 1980 (KSL & CHW). Wanfeng, ♀, VI. 1984, Malaise trap (KSL & KCC); 2♀♀, VIII. 1984, Malaise trap (KSL & KCC). Tungpu, ♀, 20–24. IV. 1980 (TL & KCC); 3♂♂, 28. VI-2. V. 1981 (TL & CJL); 6♂♂, 5–8. X. 1981 (TL & WST); ♂, 18–23. XI. 1981 (TL & WST); 2♂♂, 20–24. IV. 1982 (TL & KCC); ♂, 19–23. VII. 1982 (LYC & TL); ♂, 18–21. X. 1982 (KCC & SCL); ♀, 2♂♂, 20–24. VI. 1983 (KCC & CYW); ♀, ♂, 16–20. IV. 1984 (KCC & CHY); 6♀♀, 7♂♂, 23–27. VII. 1984 (KCC & CHY); ♀, IX. 1985, Malaise trap (KSL). Chitou, ♂, 13. X. 1957 (KSL). Wushe, ♂, 23–28. VI. 1981 (KSL & WST); ♀, 30. VIII-2. IX. 1982 (LYC & KCC); ♂, 7. V. 1984 (KCC & CCP); ♂, 17. VIII. 1984 (KCC). Lienhuachih, ♀, VIII. 1984, ♀, IX. 1984, Malaise trap (KSL & KCC). Fuli to Tungho, ♀, 9–11. XI. 1982 (KCC & SPH).

This species is separable from *major* in the shape of the scutellar cup and the posterior part of pronotal plate.

Aganaspis major Lin, sp. nov.

(Figs. 20–29, 43–44)

Female. Body length 2.3–3.0 mm, fore wing 2.5–3.1 mm. Head narrower than thorax (30:34), in dorsal view about 1.8 times as wide as long; ocelli arranged in a broad triangle, diameter of anterior ocellus about 4 micrometric units, LOL:POL:OOL about 3.5:7:5; eye large, 1.5 times as high as broad, distinctly prominent, temple (in lateral view of head) as long as eye, malar space 0.47 as long as height of eye. Antenna 2.5 times as wide of head, segments 5–13 with rhinaria and jointly forming the club, relative lengths and widths of segments about as 7:3.8; 3.5:3.5; 7:2.8; 5.3:3.4; 6:4; 6:4; 5.5:4; 5.3:4; 5:4; 5.5:4; 5.5:4; 5.5:4; 8:4.2.

Ratio of dimensions of thorax about 1.6:1:1.2. Posterior part of pronotal plate in profile forming an 85° angle with mesopleural suture; median bridge of the plate about 0.28 as wide as posterior part, which is almost as wide as anterior part, anterior part with transverse winkles; lateral margin of posterior part broadly rounded, dorsal margin broadly concave. Mesoscutum as long as wide, longitudinal convex, anterior parallel lines and notauli absent, with scattered notaulic hairs, lateral lines present. Scutellum about 1.5 times as long as wide, lateral bar smooth, bent; lateral depresion definable posteriorly; anterior fovea large, deep, smooth, almost as long as wide; cup very large, overhanging behind disc, weakly convex, with distinct rim, with 4–5 hairs situated on posterior portion; posterior fovea large, circular, its bottem finely sculptured; disc rounded laterally and posteriorly, foveolate-rugose, with long curved hairs. Propodeum with submediam ridges divergent posterior part and acutly bulged outer sides; nucha rugose. Mesopleuron convex, smooth, with

3 hairs below tegula. Metapleuron bare, anteroventral cavity large, transverse; metapleural suture distinct; posterior margin thin, raised, with a small notch just at posterior end of metapleural suture, submarginal area depressed, with 2 short upper medial ridges. Fore wing 3.2 times as long as greatest width, its longest cilia on apical margin about 0.08 as long as greatest width of wing, radial cell 2.3 times as long as deep. Legs normally shaped, mid and hind coxae each with pubescent patches about 0.54 and 0.62 on posterodorsal surface, respectively. Ratio of dimensions of gaster about 2.4:1:1.9; gastral petiole very short; with ring of thick hairs at base of tergite 2, hairy ring complete or incomplete dorsally, some scattered hairs behind ring; minute punctures on posterior 0.33 of tergite 2.

Male. Body length 1.6–2.6 mm, fore wing 1.8–2.3 mm. Essentially similar to female. Head in dorsal view broader, 1.9 times as wide as long, equal in width to thorax. Ocelli arranged as a broad triangle, diameter of anterior ocellus 3 micrometric units, LOL:POL:OOL about as 3:6.5:4.5; temple (in lateral view of head) 0.6 as long as eye; eye 1.54 times as high as broad, prominent; malar space 0.24 as long as height of eye. Antenna filiform, relative lengths and widths of segments 1–8 and 14–15 about as 6:3.5; 3.6:3.2; 12.5:3.8; 7:2.4; 8:3; 8:3.2; 8:3.2; 8:3; 7:2.5; 8:2.5; segments 3–15 with rhinaria.

Posterior part of pronotal plate in profile forming an 85° angle with mesopleural suture; median bridge of pronotal plate 0.2 as wide as posterior part, which is slightly wider than anterior part, blunt angle laterally, dorsal margin broadly concave. Fore wing 2.5 times as long as maximum width, its longest cilia on apical margin about 0.09 as long as greatest width of wing, radial cell 2.5 times as long as deep. Gaster 1.5 times as long as deep, ring of thick hairs at base of tergite 2 incomplete dorsally; posterior 0.3 of tergite 2 with minute punctures.

Black. Antenna and hind coxa fuscous ferruginous, mandible, tegula, legs and base of tergite 2 ferruginous; wings hyaline, veins fulvous ferruginous; body covered with fulvous hairs, hairs on legs fulvous yellow, those on wings fulvous.

Distribution: Taiwan.

Holotype ♀, Central Taiwan: Nantou Hsien, Meifeng 2,150 m, 24–26. VI. 1981 (KSL & WST).

Paratypes: Meifeng, ♀, 26. VIII. 1980 (KSL & CHW); ♀, VI; 2♀♀, VIII. 1984, Malaise trap (KSL & KCC). Tungpu, ♀, 28. X. 1957 (FLY); ♀, 28. IV.-2. V. 1981 (TL & CJL); 10♀♀, 18–23. XI. 1981 (TL & WST); ♀, 20–24, IV. 1982 (TL & KCC); 11♀♀, 19–23. VII. 1982 (LYC & TL); ♀, 22–25. XI. 1982 (KCC & SPH); 3♀♀, 20–24. VI. 1983 (KCC & CYW); ♀, 16–20. IV. 1984 (KCC & CHY); 3♀♀, 23–27. VII. 1984 (KCC & CHY); ♀, XI. 1985, Malaise trap (KSL). Wushe, ♀, 23–28. VI. 1981 (KSL & WST); ♀, 7. V. 1984 (KCC). Hoshe, ♀, 22. VII. 1982 (LYC & TL). Lushan, ♂, 27–31. V. 1980 (KSL & LYC).

This species is closely related to *daci* (Weld) but can be distinguished from the latter by the elongate flagellomeres and the narrow median bridge of pronotal plate.

Aganaspis daci (Weld) comb. nov.
(Figs. 30–38)

Trybliographa (*Trybliographa*) *daci* Weld, 1951. Proc. Hawaii. ent. Soc. 14:331, ♀ ♂. Type-locality: Malaya: Kuala Lumpur. Holotype (No. 60940) in U. S. National Museum.

Female. Ocelli arranged in a rather broad triangle; dismeter of anterior ocellus 3 micrometric units, LOL:POL:OOL about as 3.6:5.2:4; temple (in lateral view of head) 0.6 as long as eye; eye about 1.5 times as high as broad, malar space about 0.34 as long as height of eye. Antenna relatively short, club of 9 segments, each with rahinaria; segments 8–12 each distinctly shorter than wide;

relative lengths and widths of segments about as 5:3; 3:2.6; 4.5:2.1; 3:2.4; 4:3; 4:3.3; 4:3.5; 3.5:3.8; 3.5:3.8; 3.5:3.8; 3.5:3.8; 3.5:3.9; 5.5:3.8.

Ratio of dimensions of thorax about 1.7:1:1.2. Posterior part of pronotal plate in profile forming an 85° angle with mesopleural suture; anterior part of the plate with transverse wrinkles; median bridge about 0.31 as wide as posterior part, dorsal margin of posterior part weakly broadly concave. Fore wing with longest cilia on apical margin about 0.12 as long as its greatest width, radial cell relatively short, about 2.4 times as long as deep. Ratio of dimensions of gaster about 2.7:1:1.9. Gastral tergite 2 with minute punctures at posterior 0.3.

Male. Anterior ocellus with a diameter of 3.5 micrometric units, LOL:POL:OOL about as 3:6:3.5; temple (in lateral view of head) 0.46 as long as eye; eye about 1.39 times as high as broad, malar space 0.22 as long as height of eye. Relative lengths and widths of antennal segments 1–8 and 14–15 about as 6:3.5; 3:3; 13:4; 7:3.2; 7:3; 7:3; 7:3; 6.5:3; 6.5:2.7; 7.2:2.5; segments 3–15 with rhinaria.

Posterior part of pronotal plate in profile forming an 85° angle with mesopleural suture; posterolateral margin of posterior part weakly rounded. Fore wing with longest cilia on apical margin about 0.08 as long as greatest width, radial cell about 2.4 times as long as deep. Gastral tergite 2 with ring of thick hairs which is incomplete dorsally, and with minute punctures on posterior 0.23.

Host: *Dacus dorsalis* (Hendel), the Oriental fruit fly.

Distribution: Malaya.

Specimen examined: Paratypes ♀ and ♂, Hawaii: Honolulu (Plant Pest Control Branch, Division of Plant Industry, State Department of Agriculture), I–III. 1949. Reared from *Dacus dorsalis* in insectary condition.

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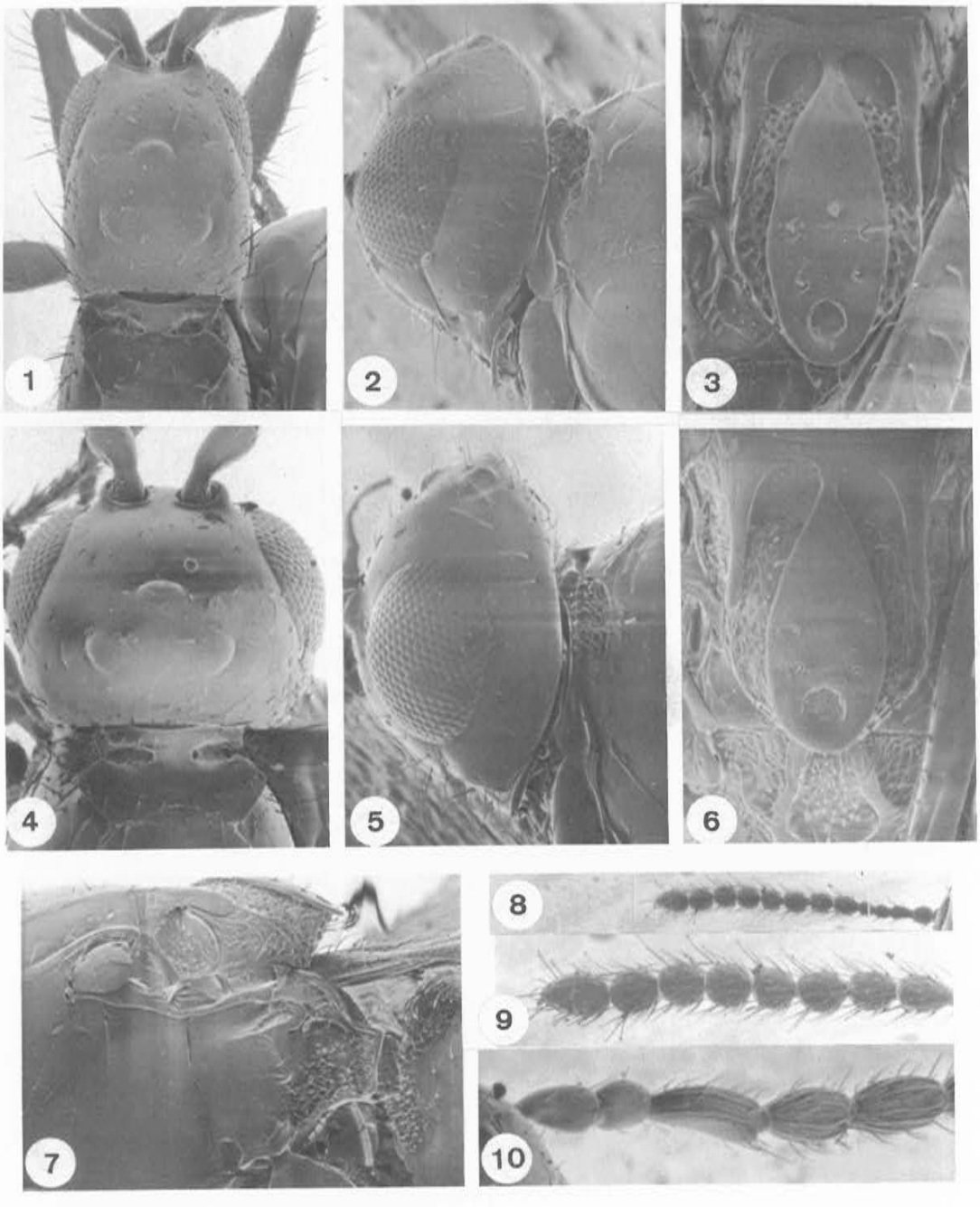
釉瘿蜂科之一新屬 —— *Aganaspis*

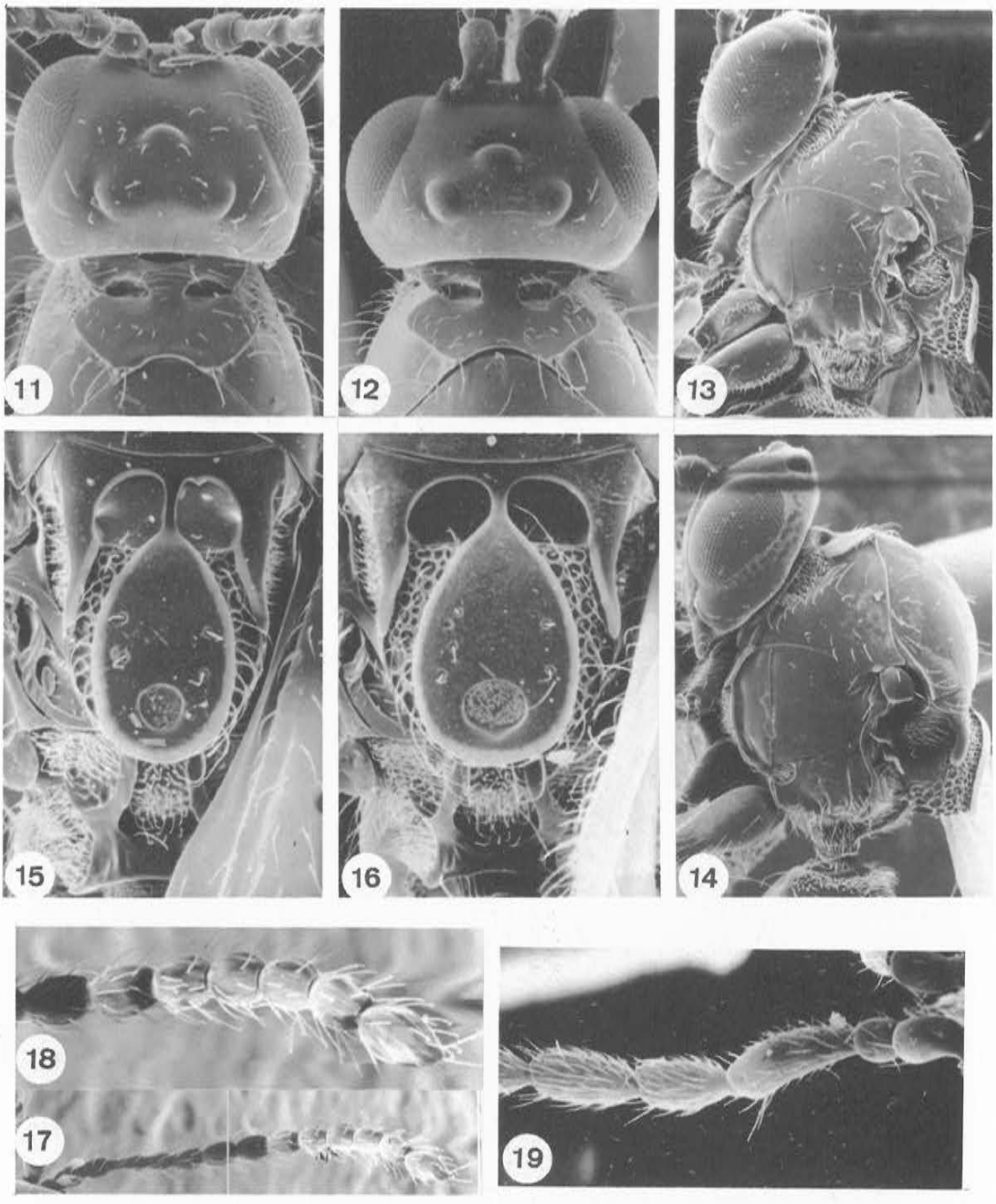
林 珪 瑞

中文摘要

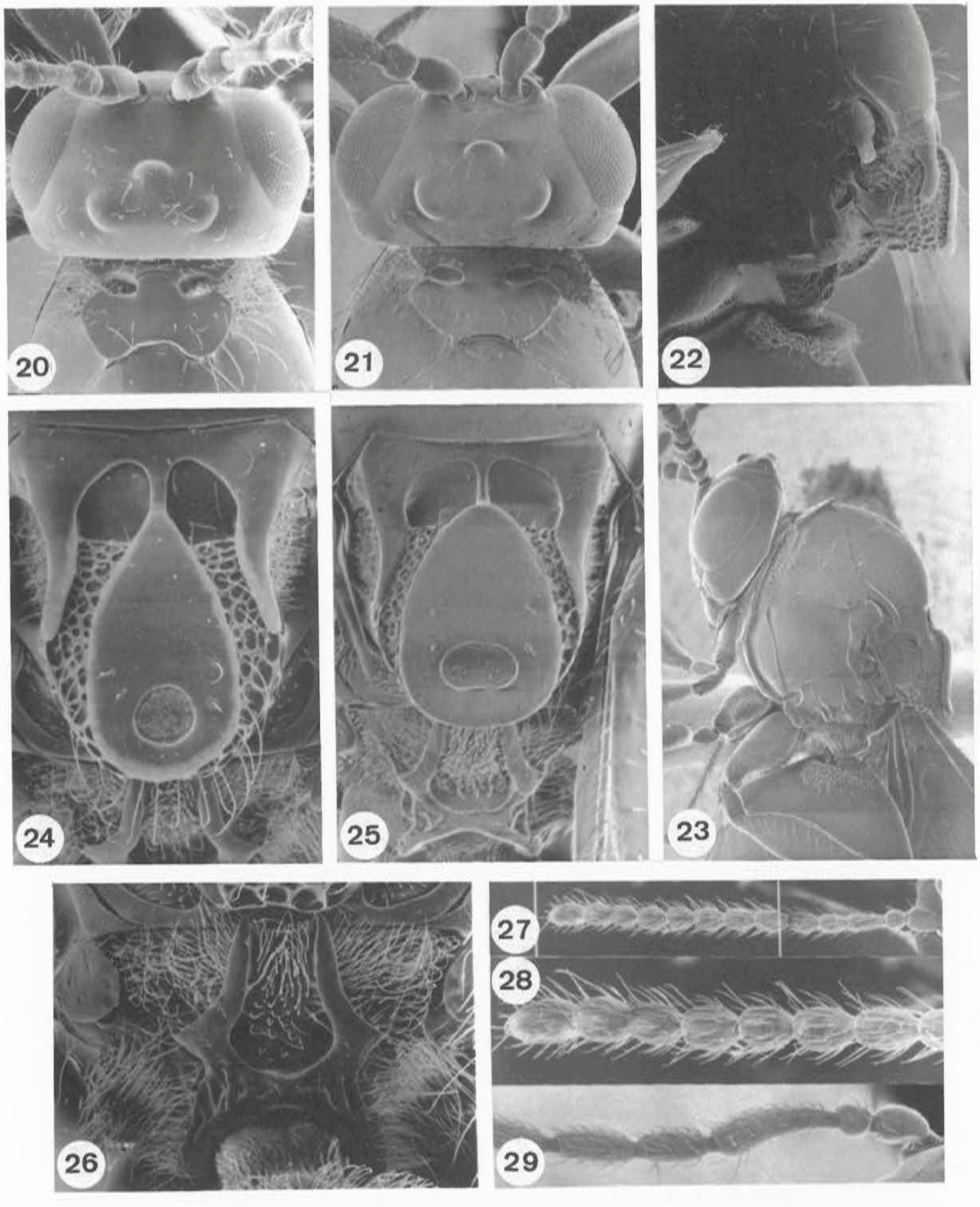
本文創立genus *Aganaspis* nov. 新屬，依據形態特徵可歸於 *Ganaspis*-group 屬群。包括 *A. daci* (Weld) comb. nov.寄生於東方果蠅，從馬來亞引入夏威夷，及臺灣發現之窄釉瘿蜂 *A. contracta*，單眼釉瘿蜂*A. ocellata*，巨釉瘿蜂*A. major* spp. nov.等 4 種。經詳加記載及重新記載，各主要分類特徵以掃描電子顯微鏡(SEM)觀察照相，並附該屬分種檢索表。



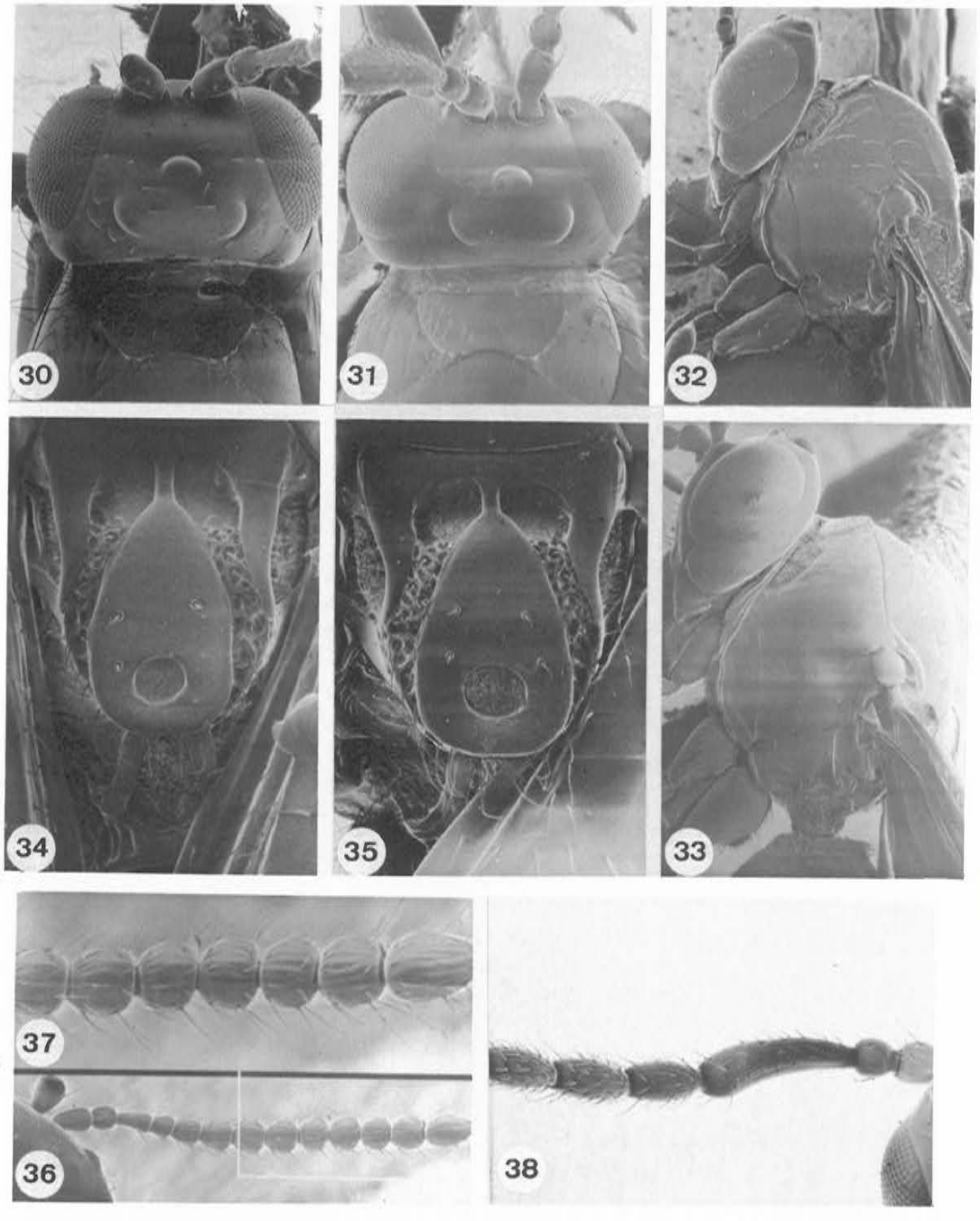
Figs. 1–10. *Aganaspis contracta* sp. nov. Holotype and paratype. 1–3, 7–9, female; 4–6, 10, male. 1, 4 heads and pronotal plates in dorsal view; 2, 5, heads in lateral view; 3, 6, scutella; 7, scutellum, metapleuron, propodeum and base of tergite 2 in lateral view; 8, female antenna; 9, same, segments 6–13, more enlarged; 10, male antenna, segments 1–5. (All specimens SEM, uncoated 1 kv)



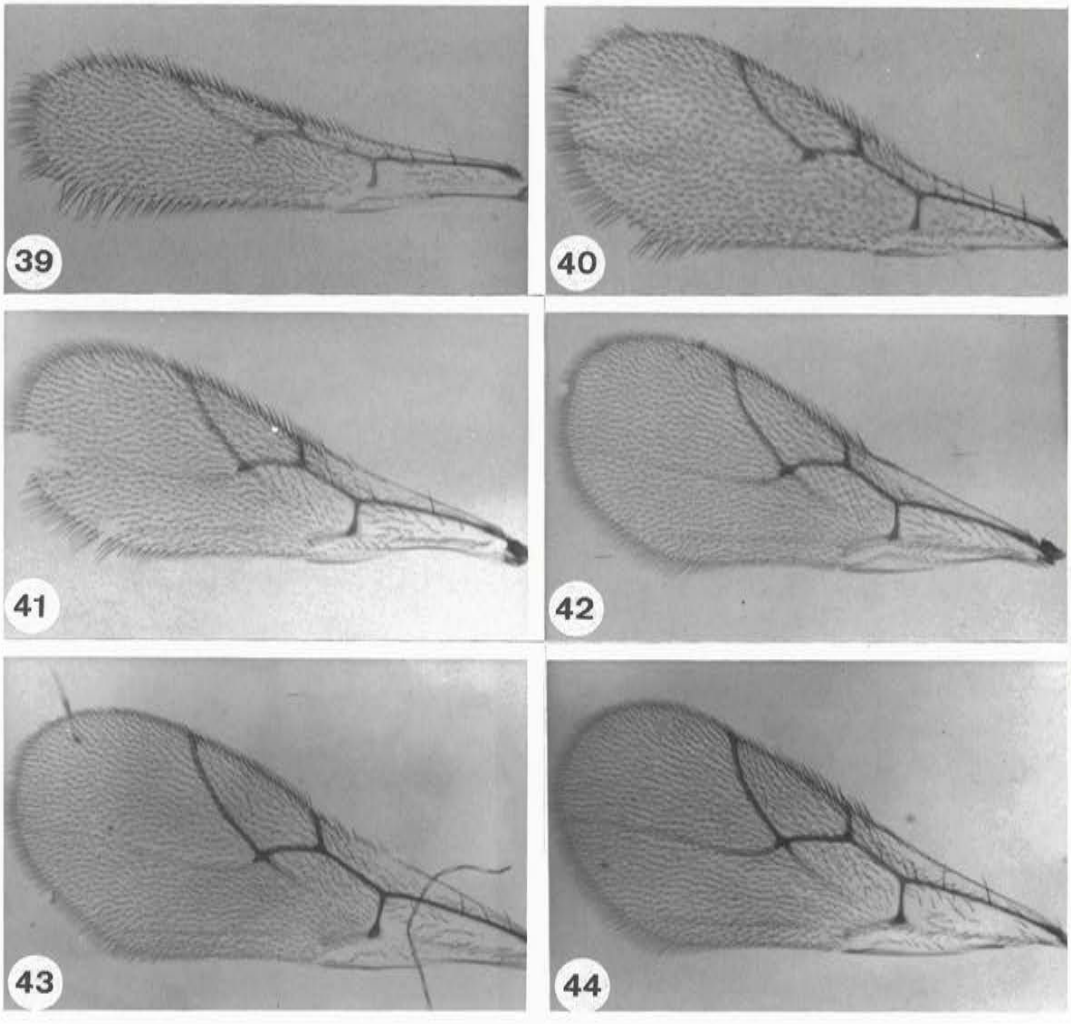
Figs. 11–19. *Aganaspis ocellata* sp. nov. Paratypes. 11, 13, 15, 17–18, females; 12, 14, 16, 19, male. 12, 12, heads and pronotal plates in dorsal view; 13, 14, heads, thoraces and bases of tergite 2 in lateral view; 15, 16, scutella; 17, female antenna; 18, same, segments 7–13, more enlarged; 19, male antenna, segments 1–5. (All specimens SEM, gold coated 15 kv)



Figs. 20–29. *Aganaspis major* sp. nov. Paratypes. 20, 22, 24, 26–28, female; 21, 23, 25, 29, male. 20, 21, heads and pronotal plates in dorsal view; 22, 23, head, thoraces and bases of tergite 2 in lateral view; 24, 25, scutella; 26, propodeum in dorsoposterior view; 27, female antenna; 28, same, segments 7–13, more enlarged; 29, male antenna, segments 1–5. (All specimens SEM, female gold coated 15 kv, male uncoated 1 kv)



Figs. 30–38. *Aganaspis daci* (Weld), Paratypes. 30, 32, 34, 36, 37, female; 31, 33, 35, 38, male. 30, 31, heads and pronotal plates in dorsal view; 32, 33, heads, thoraces and bases of tergite 2 in lateral view; 34, 35, scutella; 36, female antenna; 37, same, segments 7–13, more enlarged; 38, male antenna, segments 1–6. (All specimens SEM, uncoated 1 kv)



Figs. 39–44. Fore wings of *Aganaspis* spp. 39, 41, 43, female; 40, 42, 44, male. 39, 40, *A. contracta* sp. nov.; 41, 42, *A. ocellata* sp. nov.; 43, 44, *A major* sp. nov.

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